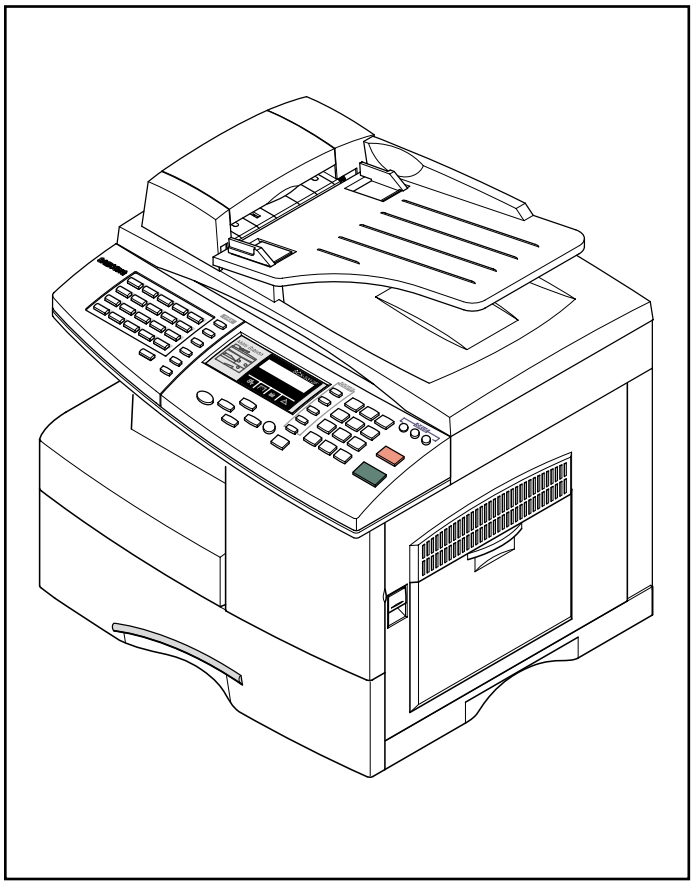
SAMSUNG

DIGITAL LASER MFP
SCX-5315F Series
SCX-5315F
SCX-5115

SERVICE MANUAL

DIGITAL LASER MFP



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ELECTRONICS

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1. Precautions

Follow these safety, ESD, and servicing precautions to prevent personal injury and equipment damage.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are in place. Replace any missing protective shields.

2. Make sure there are no cabinet openings through which people-particularly children- might insert fingers or objects and contact dangerous voltages.

3. When re-installing chassis and assemblies be sure to replace all protective devices including control knobs and compartment covers.

4. Design Alteration Warning:Never alter or add to the mechanical or electrical design of this equipment, such as auxiliary connectors, etc. Such alterations and modifications will void the manufacturer's warranty.

5. Components, parts, and wiring that appear to have overheated or are otherwise damaged should be replaced with parts which meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.

6. Observe the original lead routing, especially near sharp edges, AC, and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board.

7. Product Safety Notice:Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they provide could be lost if a replacement component differs from the original. This holds true, even though the replacement may be rated for higher voltage, wattage, etc.

8. Components critical for safety are indicated in the parts list with symbols . ⚠⚠
   Use only replacement components that have the same ratings, especially for flame resistance and dielectric specifications. A replacement part that does not have the same safety characteristics as the original may create shock, fire, or other safety hazards.

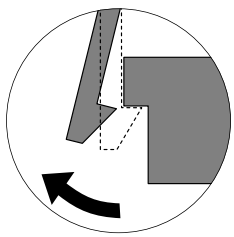
1-2 Precautions on Disassembly and Reassembly

Take great care when replacing parts. Before removing a part take careful note of its orientation and any wiring routing. Ensure that all parts removed are correctly replaced in their original positions and all wiring is routed as it was originally manufactured. Changing wiring routes can cause electrical interference or degradation in set performance.
Please do the following before disassembling for a repair or replacement of parts.

1. Remove the paper cassette and toner cartridge. Take great care to ensure that the developer drum surface is not scratched or damaged by exposure to light.
2. Turn the power switch off.
3. Take out the power plug and disconnect the printer cable from the printer.
4. Use only the same type of part as originally fitted when replacing parts.
5. Take care when dismantling plastic components and covers. Ensure covers are not damaged. Do not force plastic components apart they may break.
6. Be careful that small parts such as screws do not get lost inside the printer.
7. When disassembling take note of the placement of small parts. Ensure all small parts are properly reassembled.
8. If is is necessary to turn the printer upside down protect the LSU window with clean paper so that no loose toner particles contaminate the glass.

Releasing Plastic Latches

Many of parts are held in place with plastic latches. The latches break easily : release them carefully.
To remove such parts, press the hook end of the latch away from the part to which it is latched.



1-3 ESD Precautions

1. Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called “Electrostatically Sensitive (ES) Devices”, or ESDs. Examples of typical ESDs are: integrated circuits, some field effect transistors, and semiconductor “chip” components.

   The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

   CAUTION : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

2. Immediately before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, employ a commercially available wrist strap device, which should be removed for your personal safety reasons prior to applying power to the unit under test.

3. After removing an electrical assembly equipped with ESDs, place the assembly on a conductive surface, such as aluminum or copper foil, or conductive foam, to prevent electrostatic charge buildup in the vicinity of the assembly.

4. Use only a grounded tip soldering iron to solder or desolder ESDs.
   Use only an “anti-static” solder removal device. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESDs.

5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.

6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.

7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.

9. Minimize bodily motions when handling unpackaged replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one’s foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

1-4 Super Capacitor or Lithium Battery Precautions

1. Exercise caution when replacing a super capacitor or Lithium battery. There could be a danger of explosion and subsequent operator injury and/or equipment damage if incorrectly installed.

2. Be sure to replace the battery with the same or equivalent type recommended by the manufacturer.

3. Super capacitor or Lithium batteries contain toxic substances and should not be opened, crushed, or burned for disposal.

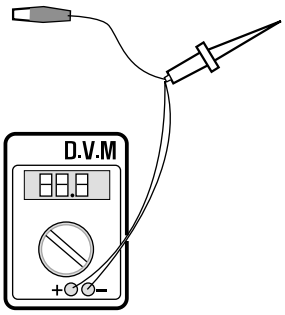
4. Dispose of used batteries according to the manufacturer’s instructions.

1-5 Tools for Troubleshooting

The following tools are recommended for safe and smooth troubleshooting described in this service manual.

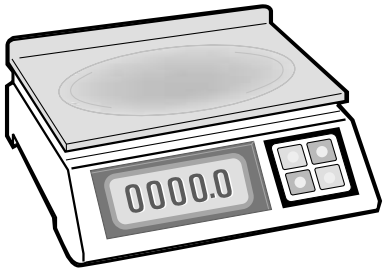
1 DVM(Digital Volt Meter)

Standard : Indicates more than 3 digits.



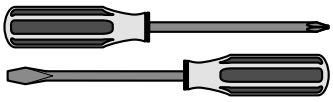
2 Electronic Scales

Standard : Equipment to check the weight of consumables(toner cartridge) supplied by Samsung Electronics. (The scales should measure in grams.)



3 Driver

Standard : "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).



4 Tweezers

Standard : For general home use, small type.

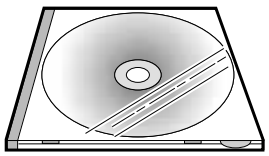
5 Cotton Swab

Standard : For general home use, for medical service.

6 Cleaning Equipments

Standard : An IPA(Isopropyl Alcohol)dry wipe tissue or a gentle neutral detergent and lint-free cloth.

7 Software (Driver) installation CD ROM



2. Specification

Specifications are correct at the time of printing. Product specifications are subject to change without notice. See below for product specifications.

2-1 General Specifications

Item	Description
Type of Unit	Desktop
Operation System	Win95/98/ME/ NT /2000/XP
Duplex Printing	Yes(Default)
Interface	IEEE1284(ECP)
	USB(without HUB mode)
CPU	120 MHz(ARM946ES)
Emulation	PCL6
Warming up Time	41 Sec (Stand-By), 25˚C
Absolute Storage Condition	Temperature : -20°C ~ 40°C, Humidity : 10% RH ~ 95% RH
Operating Condition	Temperature : 10˚C ~ 32˚C, Humidity : 20% RH ~ 80 % RH
Recommended Operating Condition	Temperature : 16°C ~ 30°C, Humidity : 30% RH ~ 70% RH
Dimension(W X D X H)	560 X 433 X 459 mm
Weight	About 22.5 Kg(with CRU)
Acoustic Noise	Less than 56/50 dB(Copy/Printing mode)
Power Rating	AC 100VAC ~ 127VAC, 50/60Hz ± 3Hz AC 220VAC ~ 240VAC , 50/60Hz ± 3Hz
Power Consumption	Avg. 350Wh (110V), 320Wh (220V)
Power Save Consumption	Avg. 30Wh
Recommended System Requirement	Pentium IV 1.2 Ghz, 128 MB RAM, 220MB(Hard Disk)
Minimum System Requirement	Pentium II 400Mhz, 64 MB RAM, 120MB(Hard Disk)
LCD	16 characters X 2 lines
Memory	4 Mbyte for flash Memory , 16 Mbyte for SDRAM

2-2 Printer Specifications

Item	Description
Printing Method	Laser Scanning Unit + Electro Photography
Speed	Single Side : 15 PPM (A4 Size, 5% Character Pattern), Letter : 16 PPM
	Duplex : 9 IPM(Images/Min) (A4 Size, 5% Character Pattern)
Source of Light	LSU(Laser Scanning Unit)
Duplex Printing	Yes(Default)
Resolution(Horizontal X Vertical)	True 600 X600 DPI , 1200 DPI Class
Feed Method	Cassette Type , By Pass Tray, ADF(Automatic Document Feeder)
Feed Direction	FISO(Front-In Side-Out)
Paper Capacity(Input)	Cassette : 550 Sheets By Pass Tray : 100 Sheets(based on 75g/m^2≥, 20lb)
Paper Capacity(Output)	Face Down : 250 Sheets
Effective Print Width	208mm for Letter/Legal 202mm for All

2-3 Facsimile Specification(SCX-5315F Only)

Item	Description
Standard Recommendation	ITU-T Group3(ITU : International Telecommunications Union)
Application Circuit	PSTN or behind PABX (PSTN : Public Switched Telephone Network. PABX : Private Automatic Branch Exchange)
Data coding(Compression)	MH/MR/MMR/JPEG(Transmission)
Modem speed	33600/28800/21600/19200/14400/12000/9600/7200/4800/2400 bps
Transmission Speed	Approximately 3 sec(33,600 bps)
Effective Scanning Width	8.2 inches(208 mm)
Halftone	256 Levels
Paper Capacity(Input)	ADF(Automatic Document Feeder) : 30Sheets(75g/m^2≥)
FAX Mode	Standard /Fine/Super Fine/Halftone
Memory	4MB

2-4 Scanner Specification

Item	Description
Type	Flatbed(with ADF)
Speed	Mono : 1.25 msec/line, Color : 2.5 msec/line
Device	Color CCD(Charge Coupled Device) Module
Interface	IEEE1284(ECP Support) USB(without HUB Mode)
Compatibility	TWAIN Standard , WIA
Optical Resolution(H X V)	600 X 600 dpi
Interpolation Resolution	Max. 4800 dpi
Halftone	256 Levels
Effective Scan width	8.2 inches(208 mm)

2-5 Copy Specification

Item	Description
Mode	B/W
Quality	Text/Photo/Mixed
Mono Copy Speed(1)	Platen(SDMP) : 15 cpm ADF (SDMP) : 15 cpm ADF (MDSP) : Text/mixed : Approx. 8 cpm : Photo : Approx. 3 cpm
Optical Resolution (H x V)	600 X 600 dpi
Multi Copy	999 pages
Maximum Original Size	Legal
Maximum Page Size	Legal
Paper Type Selection	Plain , Legal , Cardstock , Transparency
Zoom Range	Platen : 25 ~ 400%(1% Step) ADF : 25~100 %(1% Step)

NOTE :
(1) Speed claims based on the test chart : A4 size.
SDMP : Single Document Multiple Printout
MDSP : Multiple Document Single Printout

2-6 Telephone Specification(SCX-5315F Only)

Item	Description
Speed Dial	80EA
Tone/Pulse	Tone only user modeTone/Pulse selectable in tech mode.

2-7 Consumables

Item		Description
Type		Separate type (Toner Cartridge / Drum Cartridge)
Life	Toner Cartridge	6,000 sheets (5% coverage pattern, simplex normal mode)
	Drum Cartridge	15,000 sheets (simplex normal mode)

3. Disassembly and Reassembly

3-1 General Precautions on Disassembly

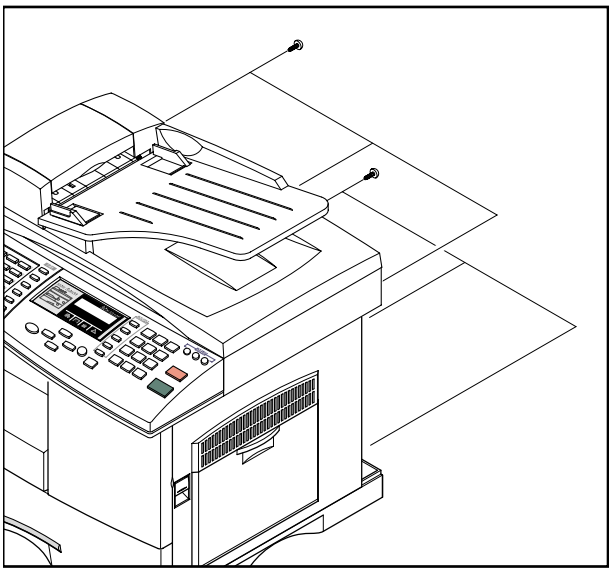
When you disassemble and reassemble components, you must use extreme caution.
The close proximity of cables to moving parts makes proper routing a must. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

Whenever servicing the machine, you must carry out the following :

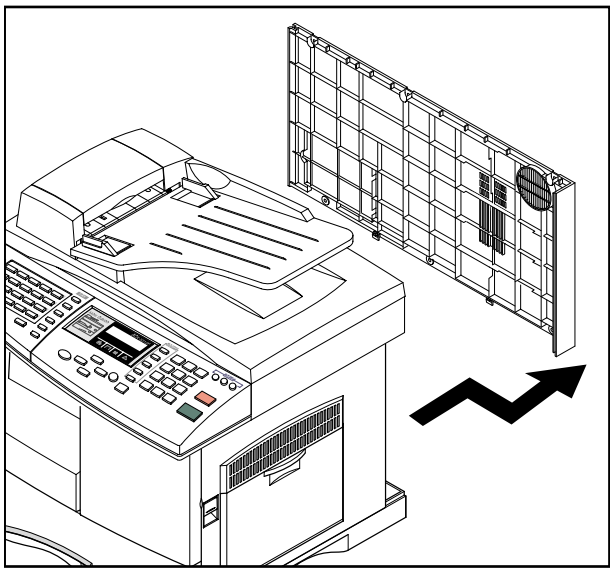
1. Check to verify that documents are not stored in memory.
2. Unplug the power cord.
3. Use a flat and clean surface.
4. Replace only with authorized components.
5. Take care when removing plastic component-do not force.
6. Make sure all components are in their proper position.

3-2 Rear Cover

1. Remove the six screws securing the Rear Cover.



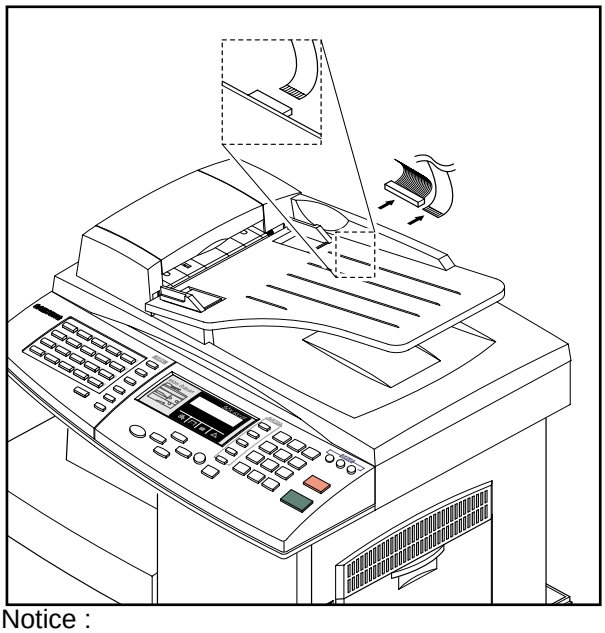
2. Separate the rear cover from the base frame and Scanner Ass'y.



3-3 Scanner Ass'y

1. Before you remove the Scanner Ass'y, you should remove:
   - Rear Cover (see page 3-1)

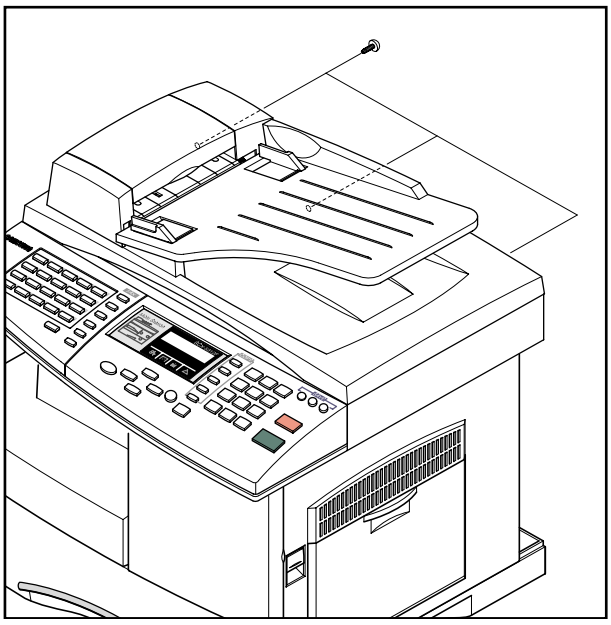
2. Take out the Shield Main Upper.Unplug the one connector and CCD cable.



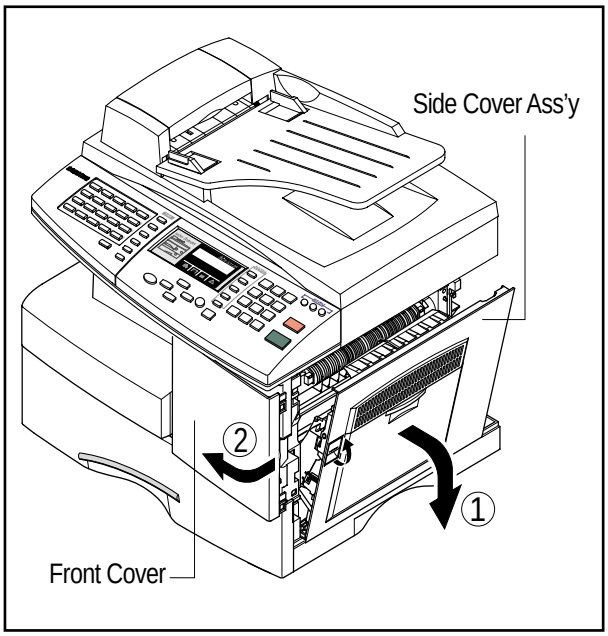
Notice :

To avoid damage to the CCD cable connector ensure that you pull the cable out carefully. Pull in line with the connector not at an angle.

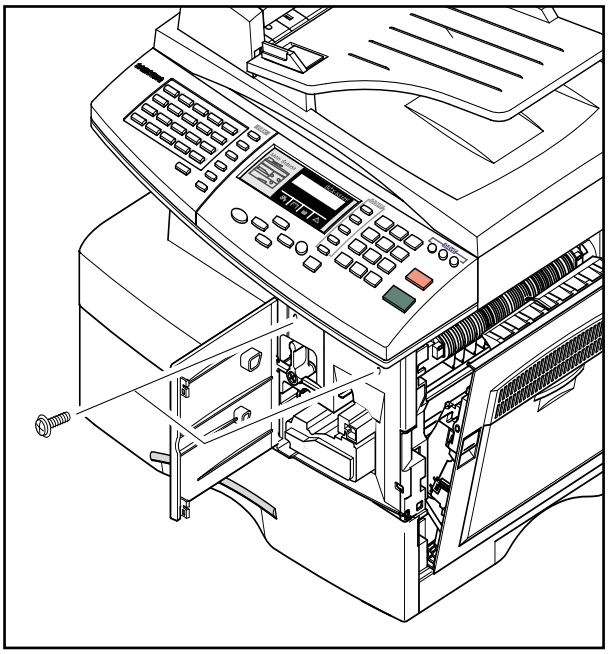
3. Remove the three screws, as shown below.



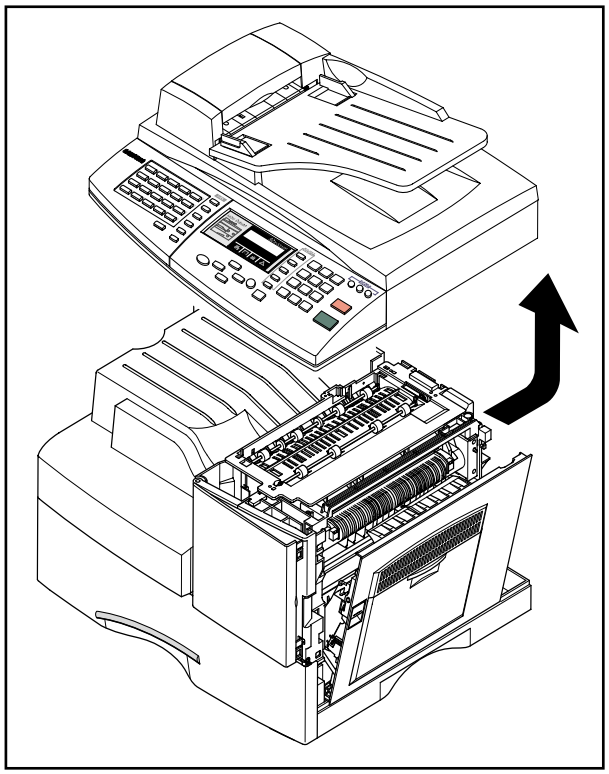
4. Open the Side Cover assembly first to open the Front cover. In the other words, close the front cover first to assembly it.



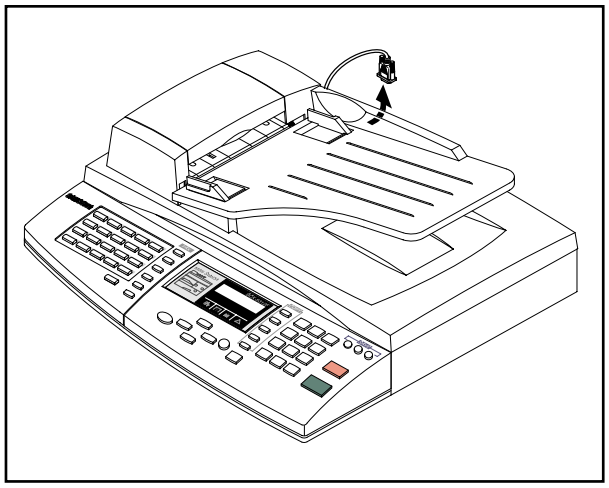
5. Remove two screws.



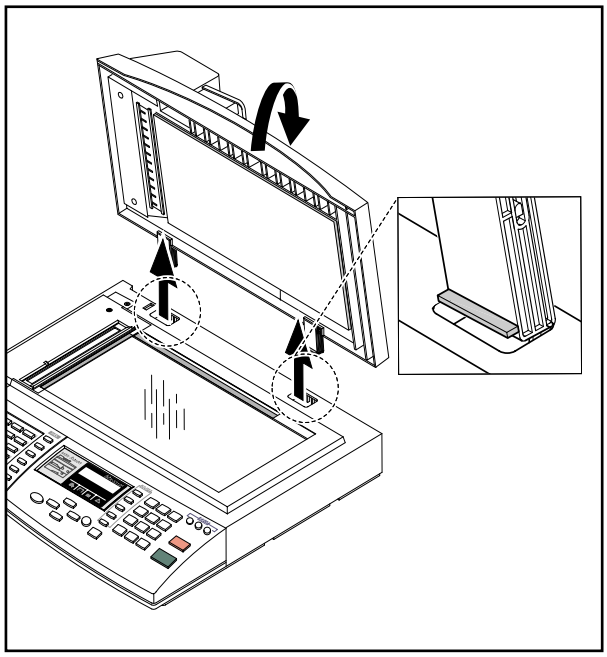
6. Pull up the Scanner Ass'y in the direction of arrow.



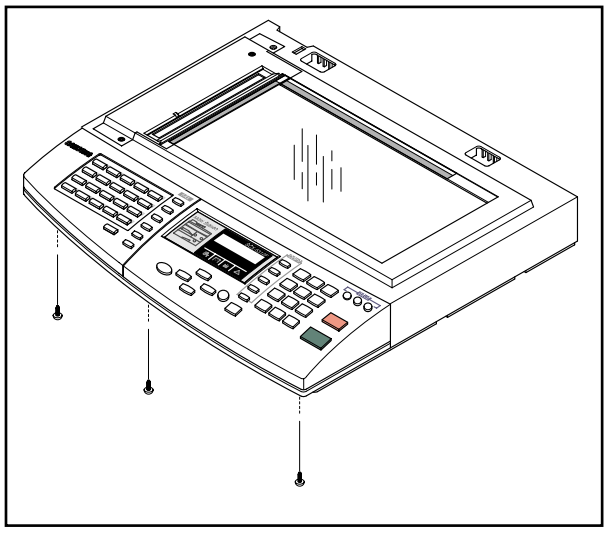
7. Remove the connector from the Platen Ass'y.



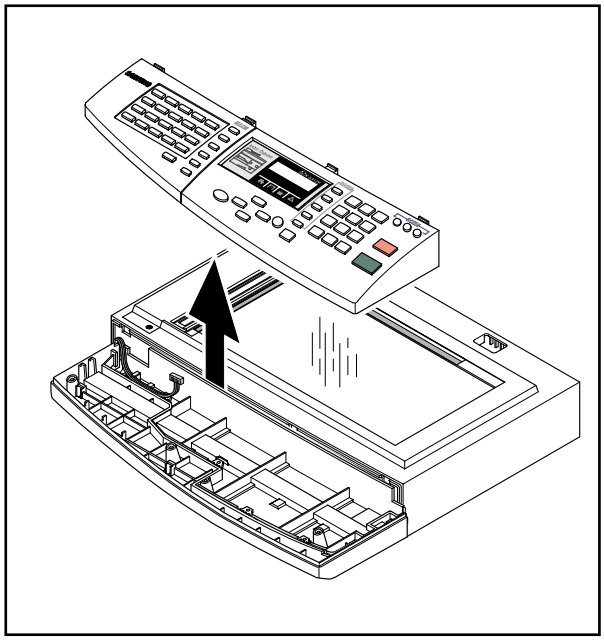
8. Open the ADF Ass'y in the direction of arrow. Pull the ADF Ass'y upward and remove it.



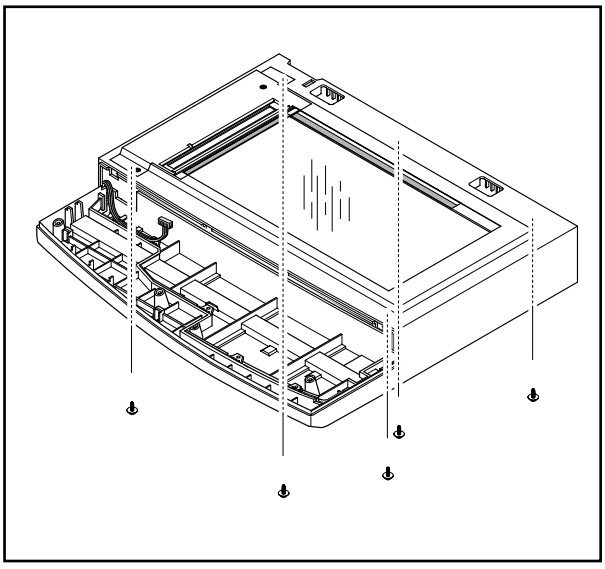
9. Remove the three screws securing the Platen Ass'y.



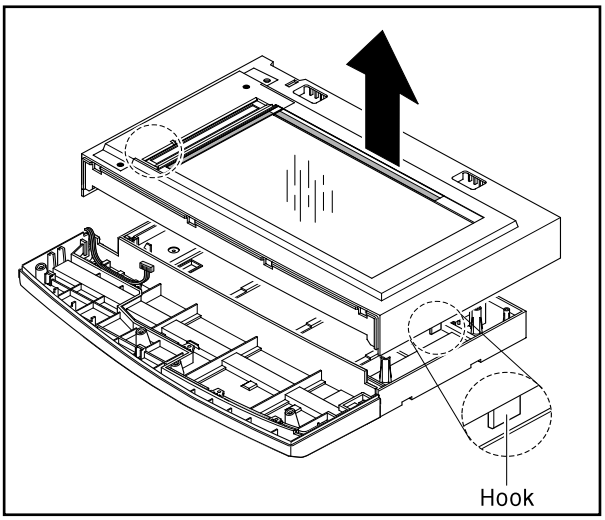
10. Pull the OPE Ass'y and unplug the one connector.



11. Remove the five screws securing the Platen Ass'y.



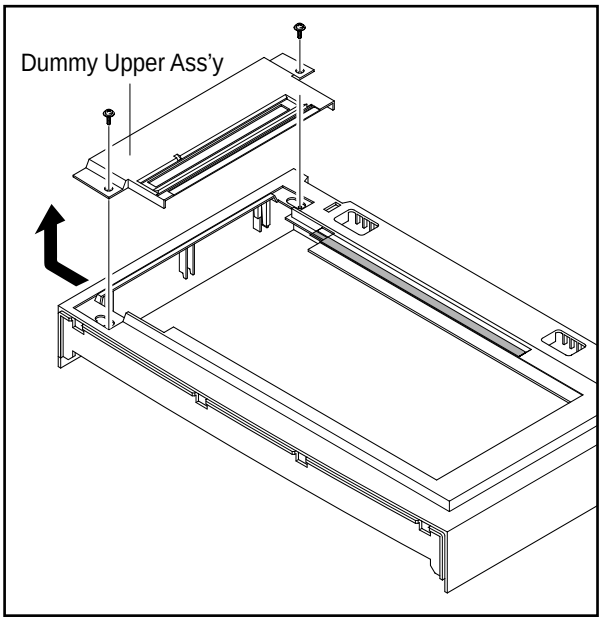
12. Unlatch the Scan Upper Ass'y securing the glass and remove it.



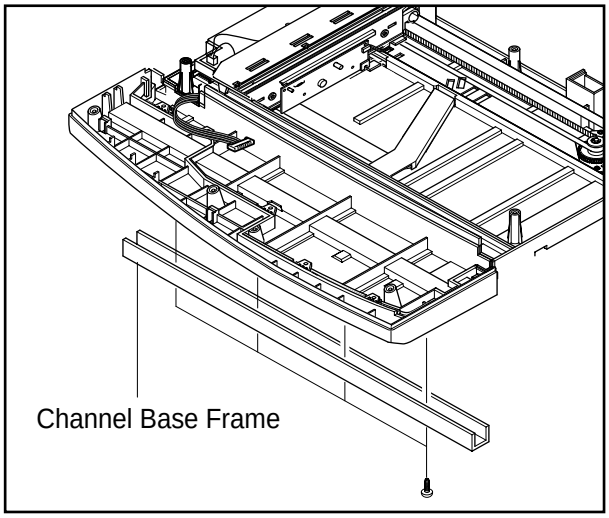
Notice :

When dismantling the Scan Assy ensure your work area is clean. Dirt or dust on the scan head can lead to a degradation in scanned image quality.

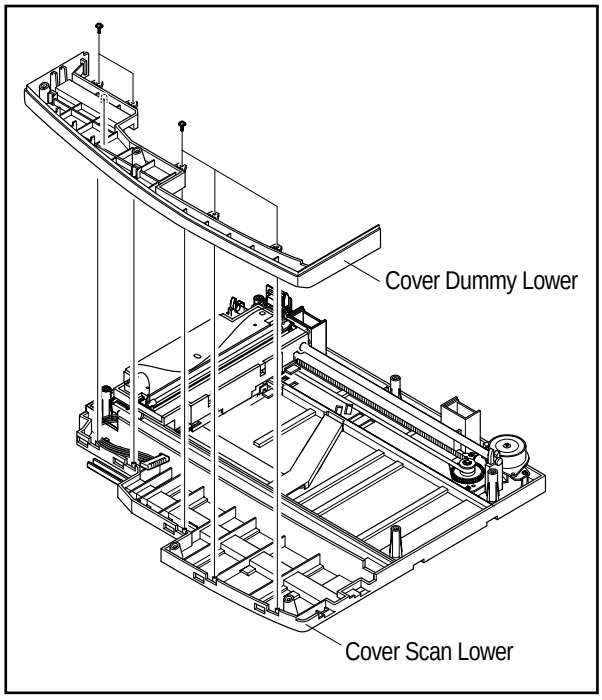
13. Remove the two scews and pull the Dummy Upper Ass'y.



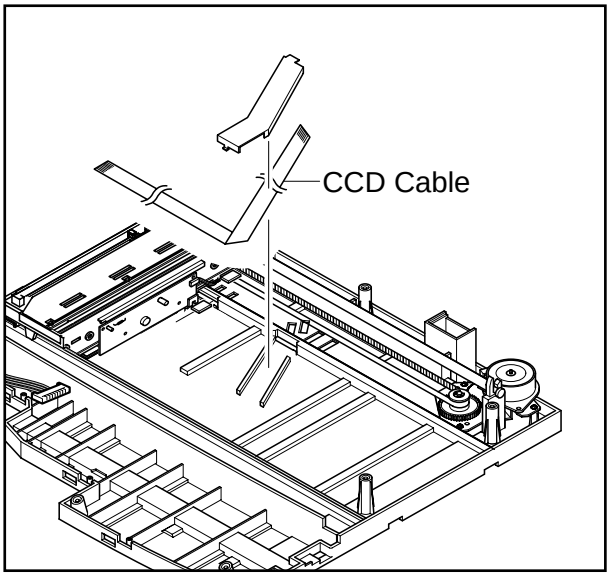
14. Remove the four screws and Channel Base Frame.



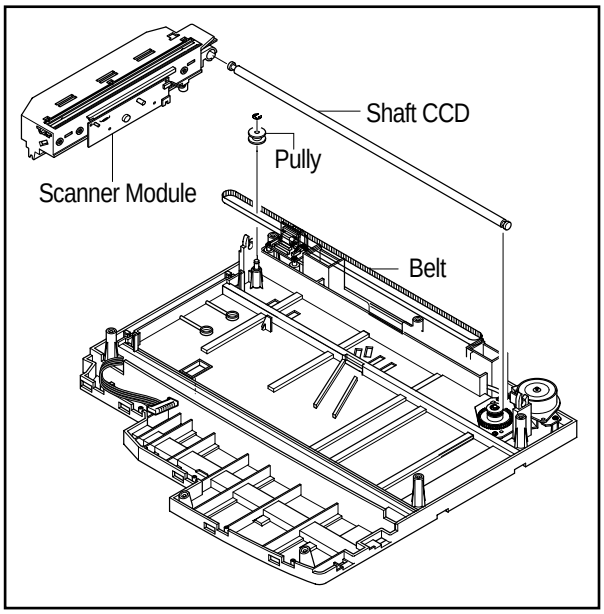
15. Remove the five screws and Dummy Scan-Lower.



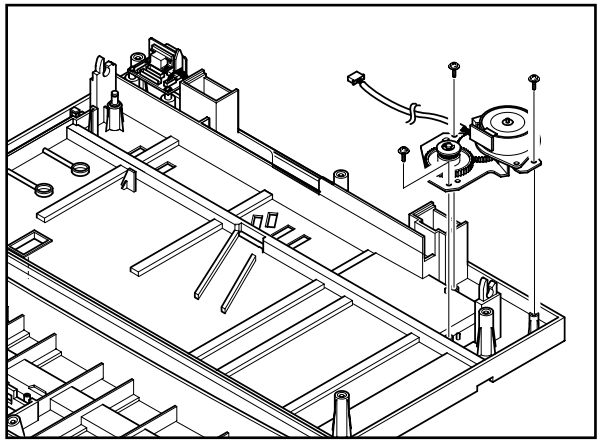
16. Remove the CCD cable.



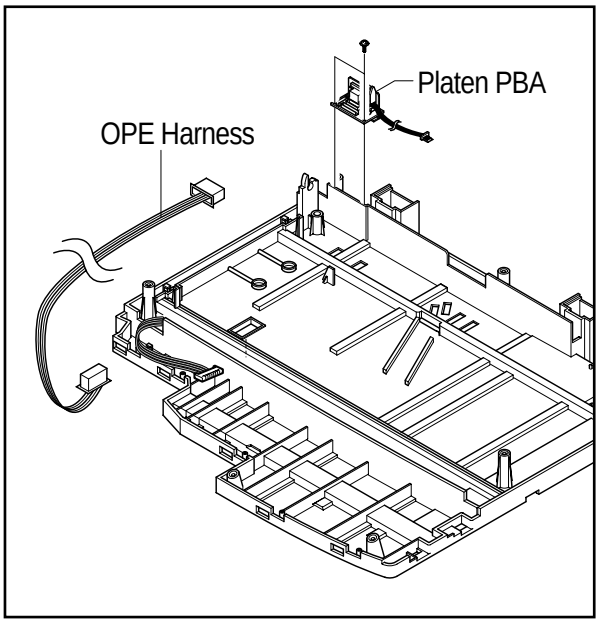
17. Pull up the Shaft CCD and take out the Scanner Module.



18. Remove three screws and take out the Motor Bracket.

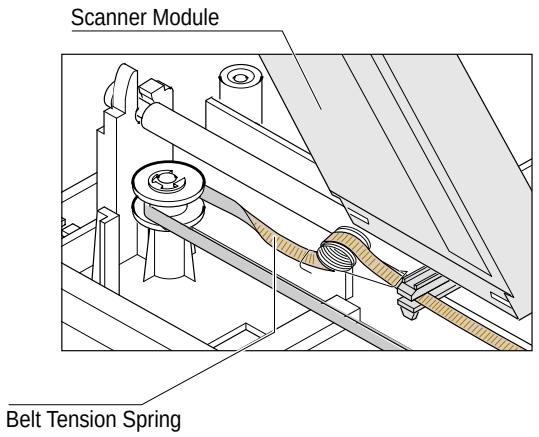


19. Remove the OPE Harness from the Platen PBA. Remove two screws and take out the Platen PBA.



Notice :

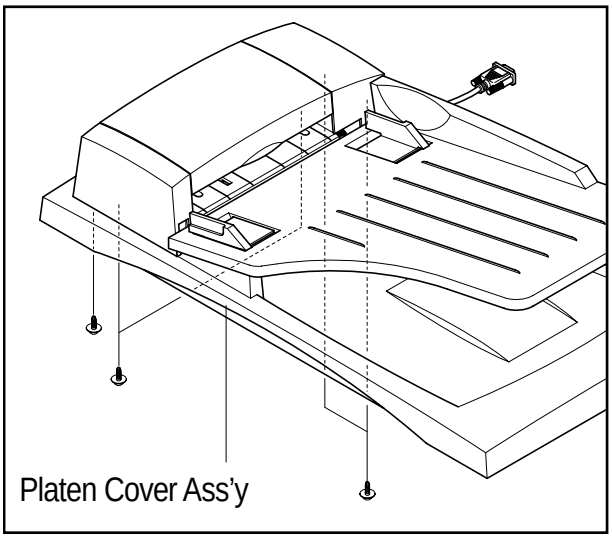
Take special care when reassembling the CCD Module onto the Platen Ass'y. The CCD Module is located just to the right side the Belt Tension Spring as shown below.



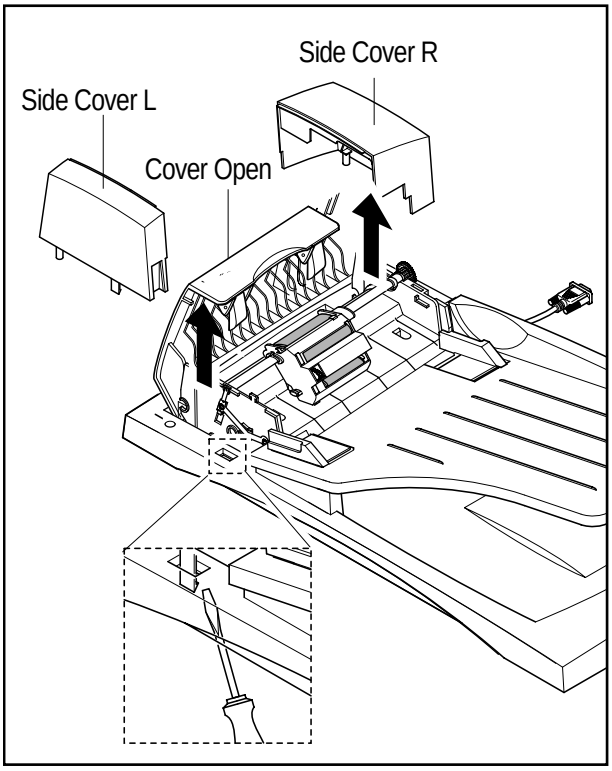
3-4 ADF Ass'y

1. Before you remove the ADF Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)

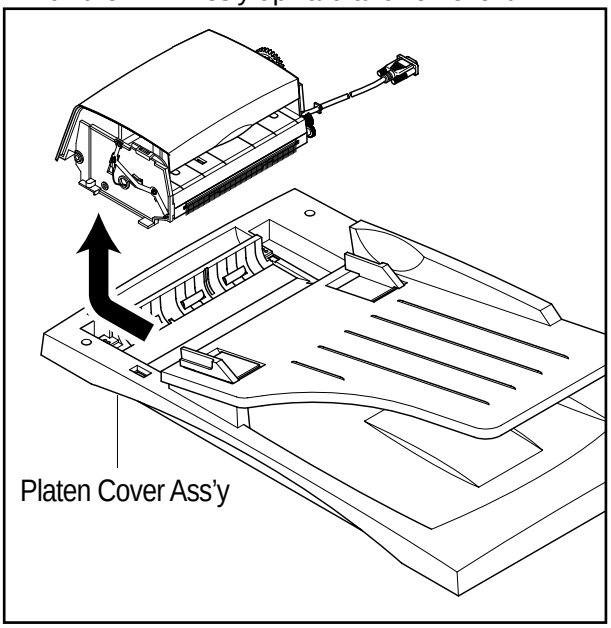
2. Remove the five screws from the Platen Cover.



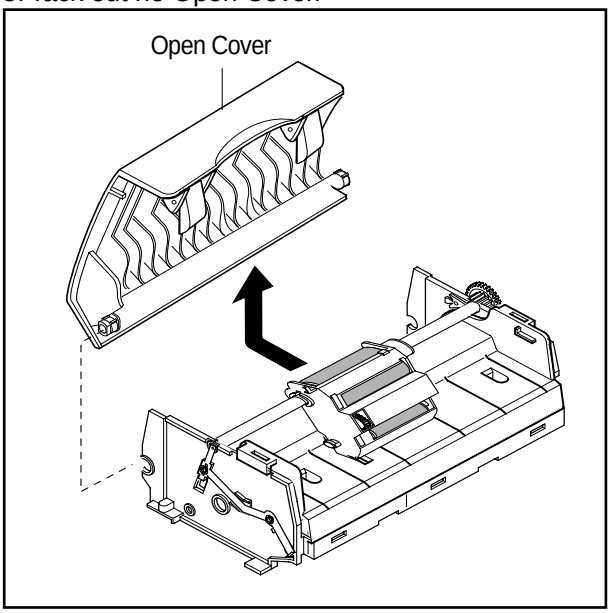
3. Open the Cover. Remove Cover Side R. Unlatch the Side Cover L by pushing the catch hooked to the Platen Cover using a sharp tool and remove Side Cover L.



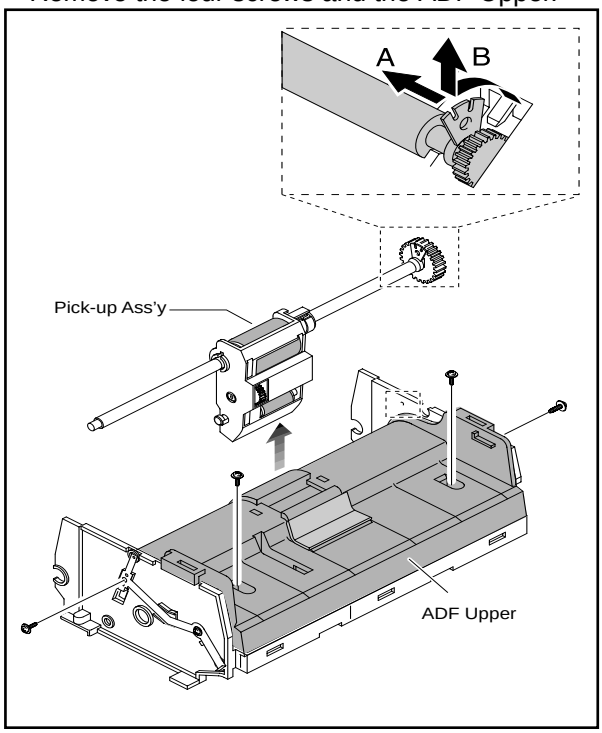
4. Pull the ADF Ass'y upward and remove it.



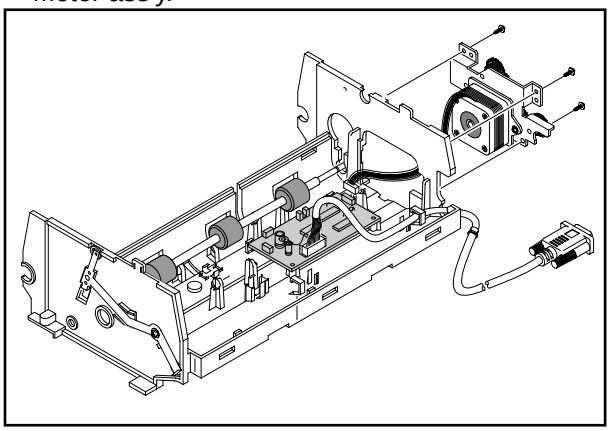
5. Tack out he Open Cover.



6. Take out the Pick-up Ass'y.
   Remove the four screws and the ADF Upper.



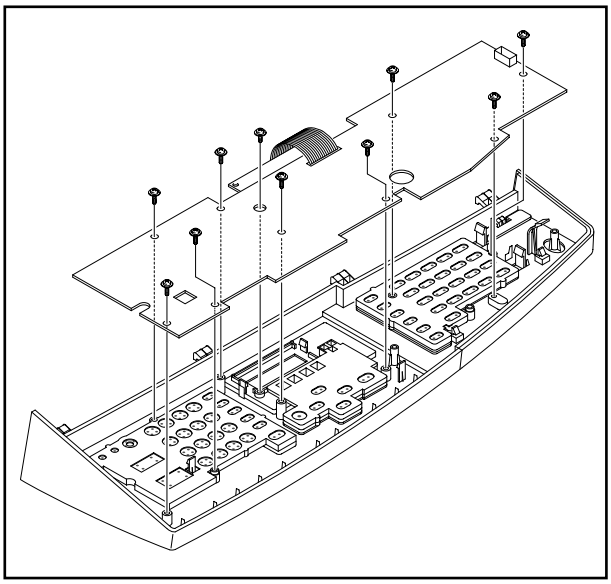
7. Remove three screws and take out the ADF Motor ass'y.



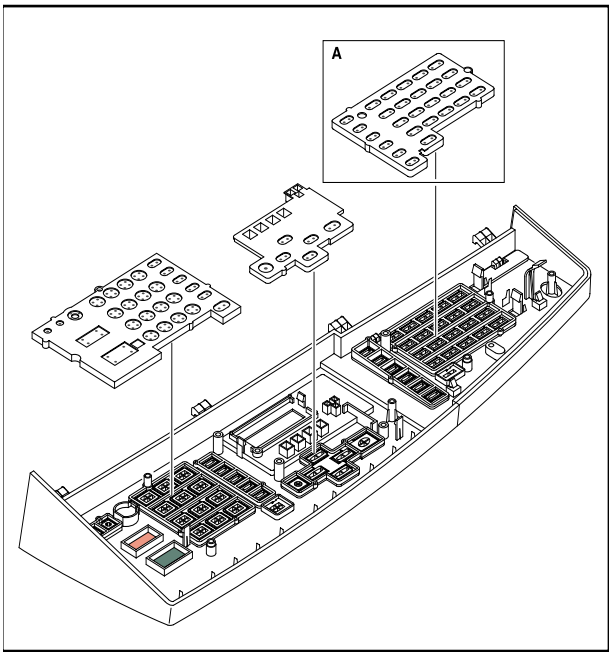
3-5 OPE Ass'y

1. Before you remove the OPE Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)

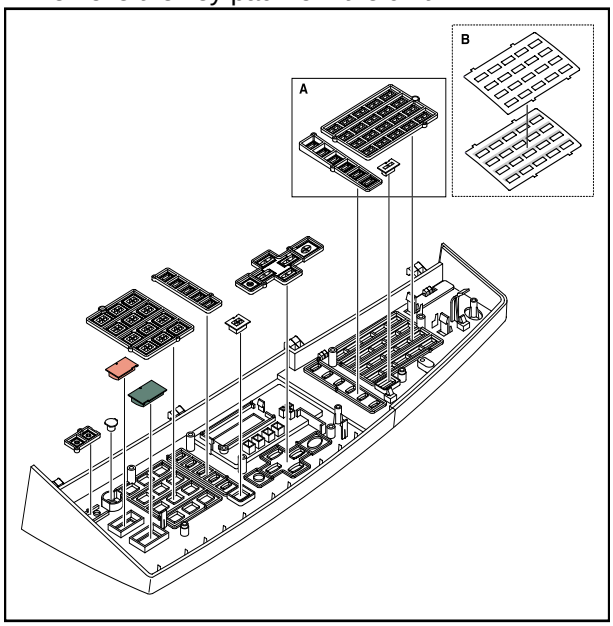
2. Remove ten screws securing the OPE PBA and the LCD Module from the OPE Cover.



3. Remove the contact rubbers from the unit.



4. Remove the key pad from the unit.

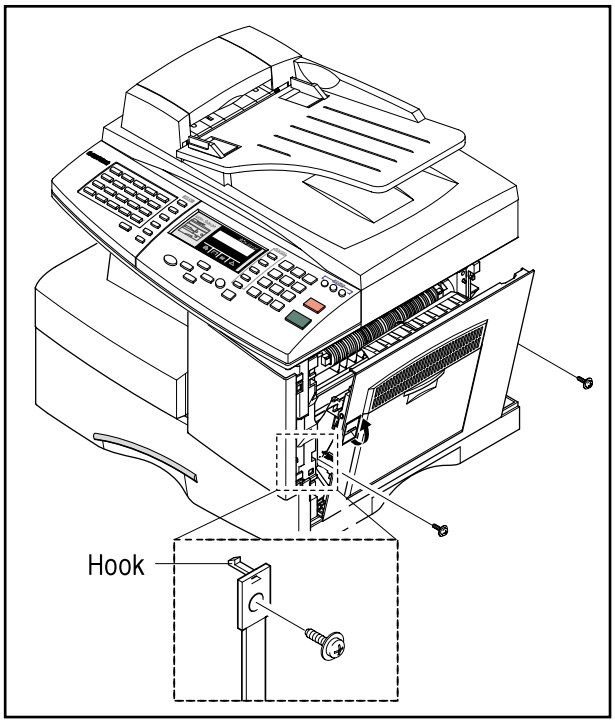


Caution

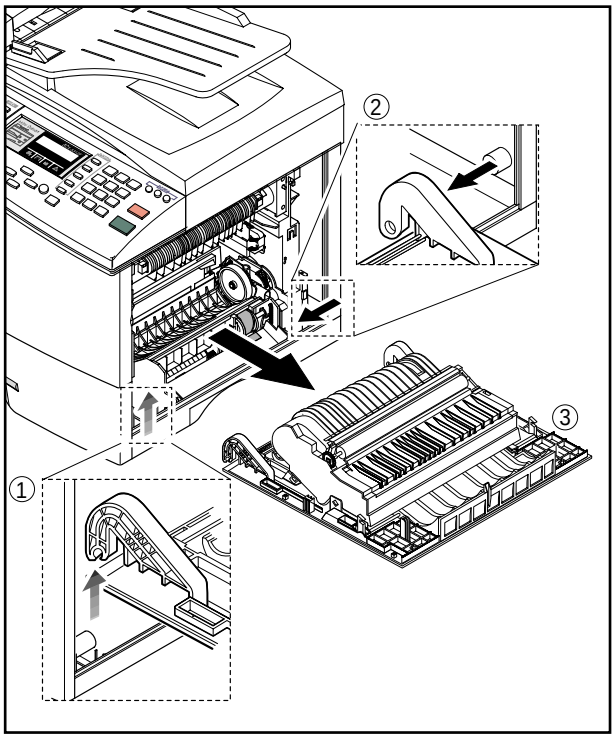
The above information is for the SCX-5315F model.
For the SCX-5115 model, the OPE Ass'y is slightly different, prats maked "a" are not fitted.

3-6 Side Cover Ass'y

1. Remove the two screws to release the Stopper(Main Frame side) securing the Side Cover to the Main Frame.

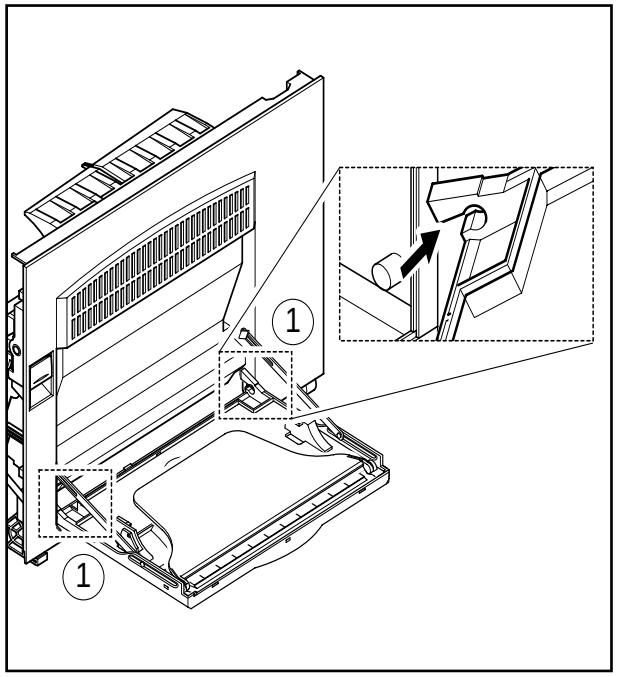


2. Completely open the Side Cover door. The left hand hinge (1) should be lifted to free it. Then push the whole door assembly to the left to free the right hand hinge (2).

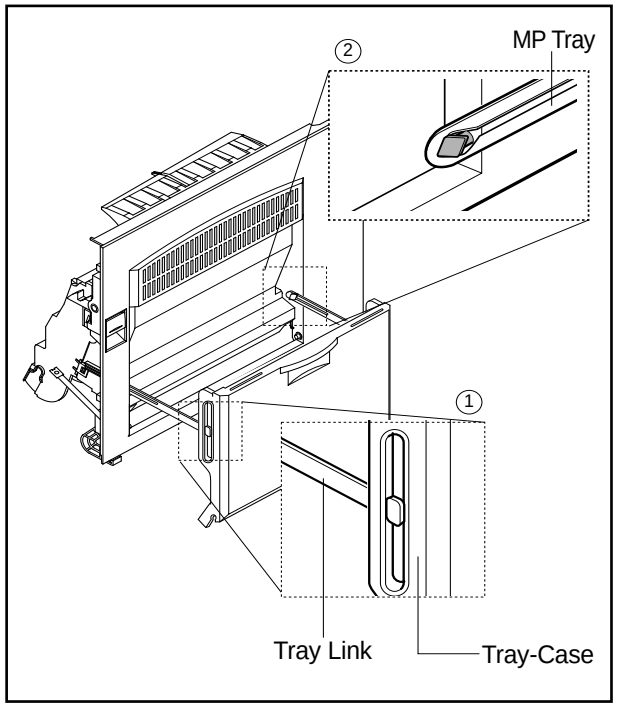


* MP-Tray

1. To dismantle the MP tray release the lower hinges (1).

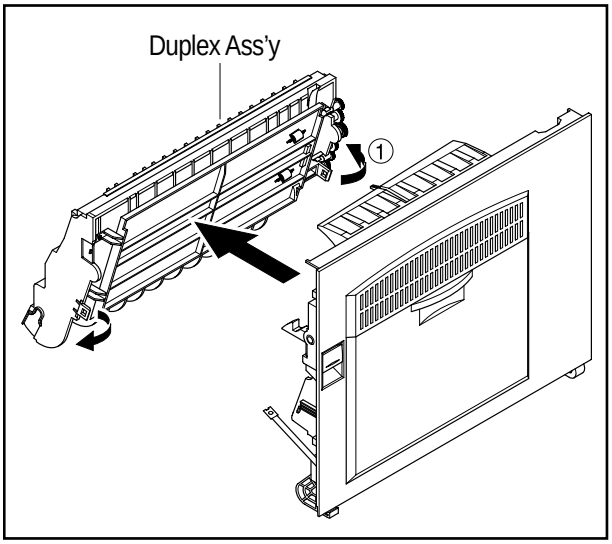


2. As shown in (1) below align the door supports in a horizontal position. This will allow the Tray-Case to be removed from the Tray Links. To remove the Tray-Links adjust the position of the Tray Link to a 45?angle to align the slot in the



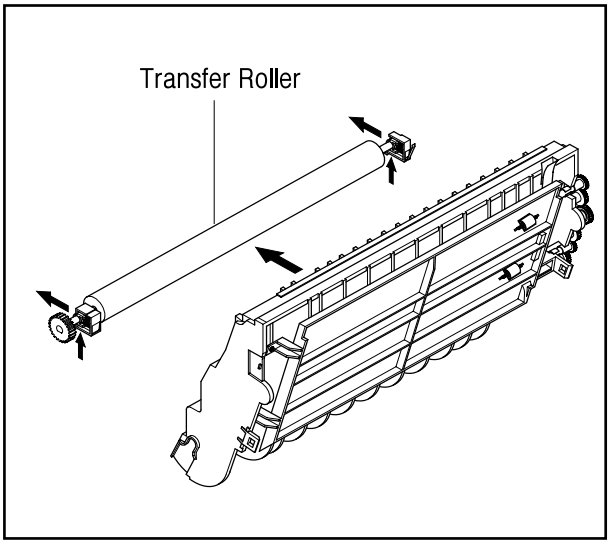
* Duplex Ass'y

1. To remove the Duplex Ass'y from the Side Door Ass' locate the plastic clips, 2 on each side, and release them.



* Transfer Roller Ass'y

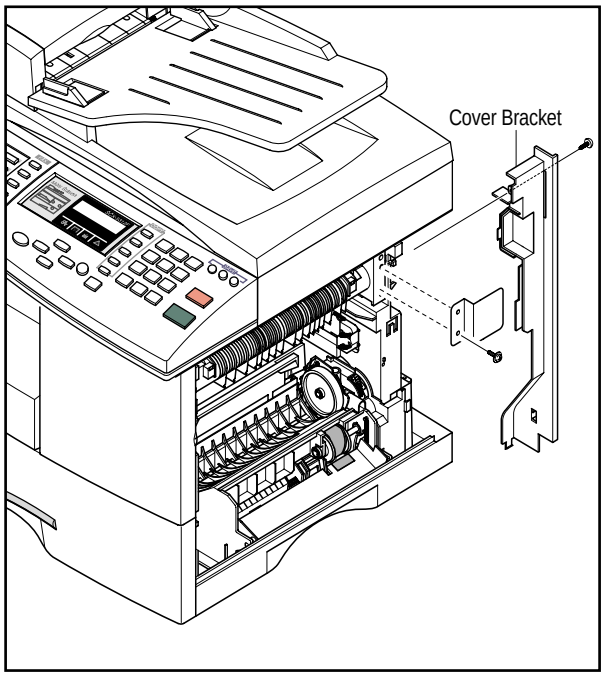
1. Take out the Transfer Roller, as shown below.



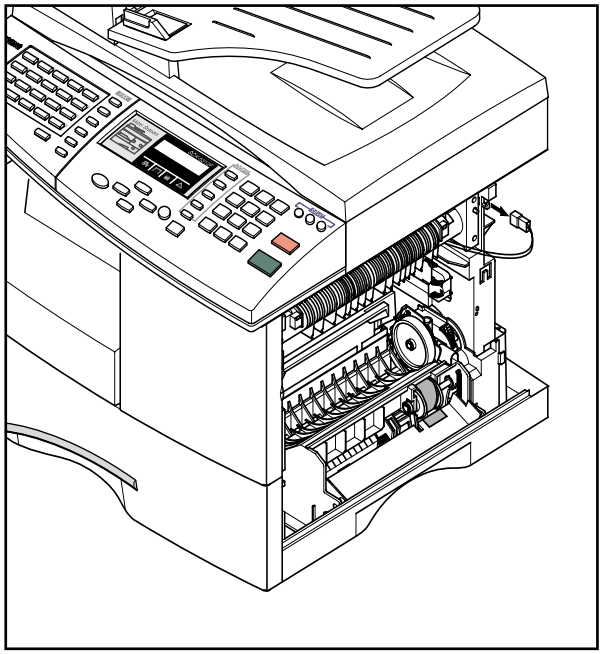
3-7 Fuser Ass'y

1. Before you remove the Fuser Ass'y, you should ensure power is off and remove :
   - Rear Cover Ass'y (see page 3-1)
   - Side Cover Ass'y (see page 3-9)

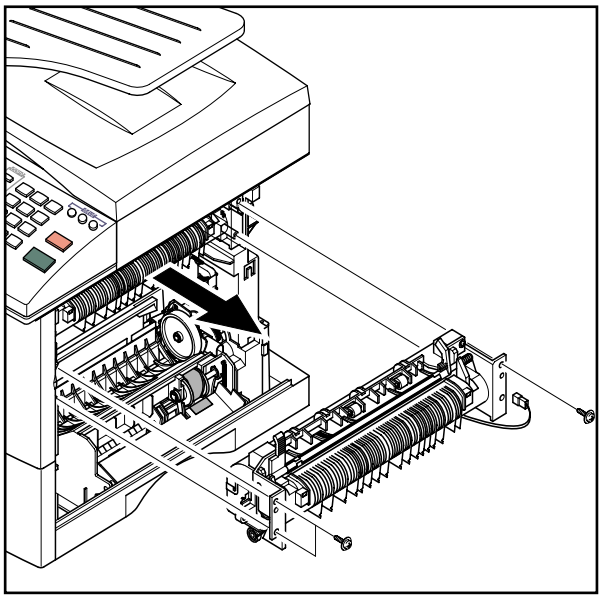
2. Remove the two screws and take out the Connector Cover and the Cover Bracket.



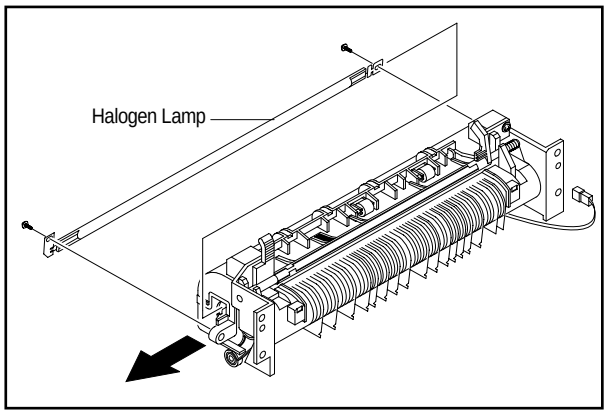
3. Unplug the one connector.



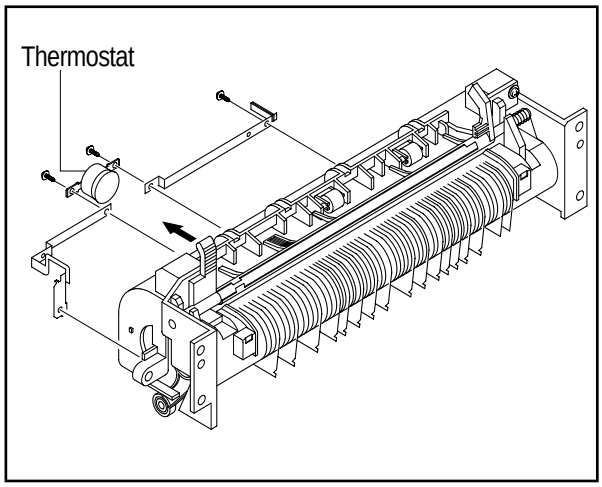
4. Remove the three screws and take out the Fuser Ass'y.



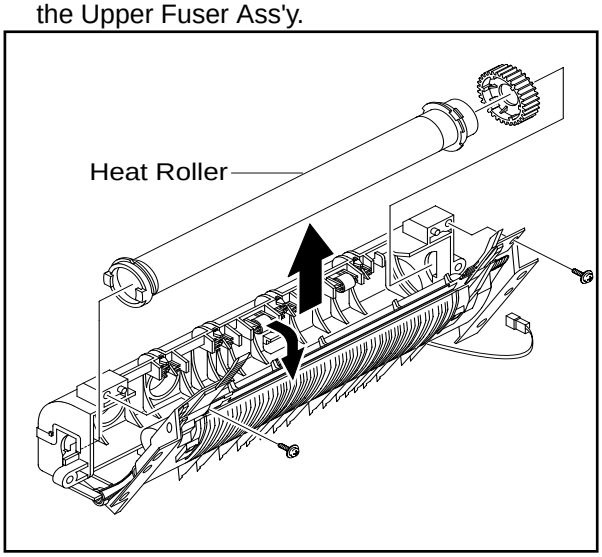
5. Remove the four screws and take out the Thermostat.



6. Remove the two screws and take out the Halogen Lamp.



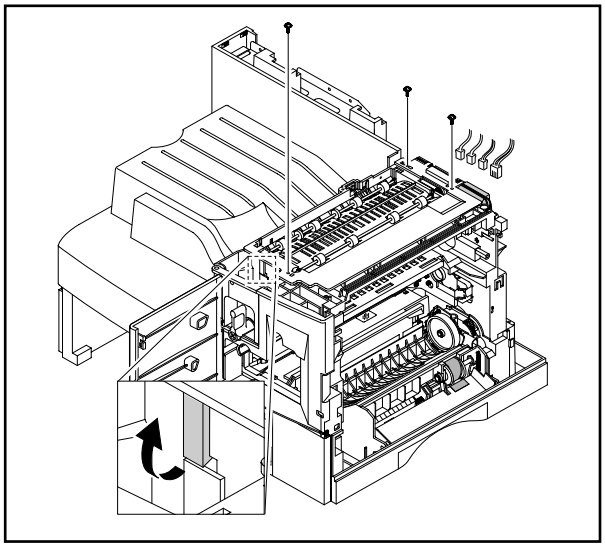
7. Remove 2 screws and hinge open the Lower Fuser Ass'y, remove the Heat Roller Ass'y from the Upper Fuser Ass'y.



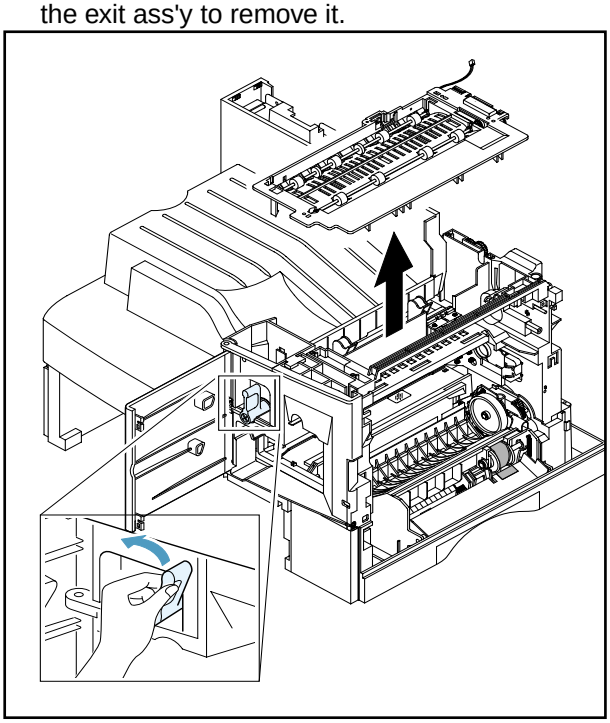
3-8 Exit Ass'y

1. Before you remove Exit Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)

2. Remove four screws, and then untie the harness from the Exit Upper. Unplug four connectors and unlatch the Dummy Base Frame, as shown below.



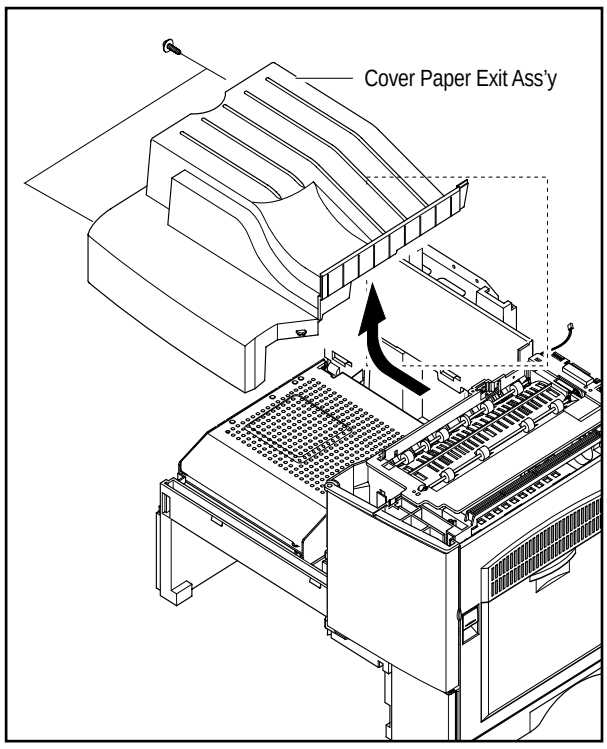
3. Move the Exit Roller Release Lever to the upright position as shown in the diagram below and lift the exit ass'y to remove it.



3-9 Cover Paper Exit Ass'y

1. Before you remove the Cover Paper Exit Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page3-2)

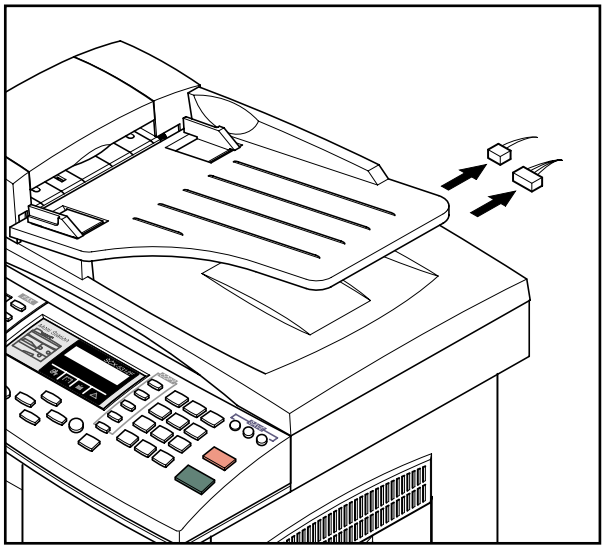
2. Remove two screws and Cover Paper Exit Ass'y, as shown below.



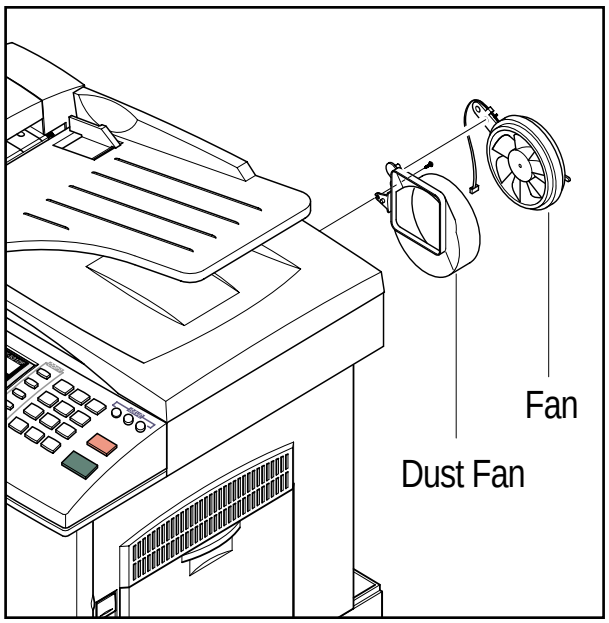
3-10 Drive Ass'y

1. Before you remove the Drive Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Shield Main Upper (see page 3-2)

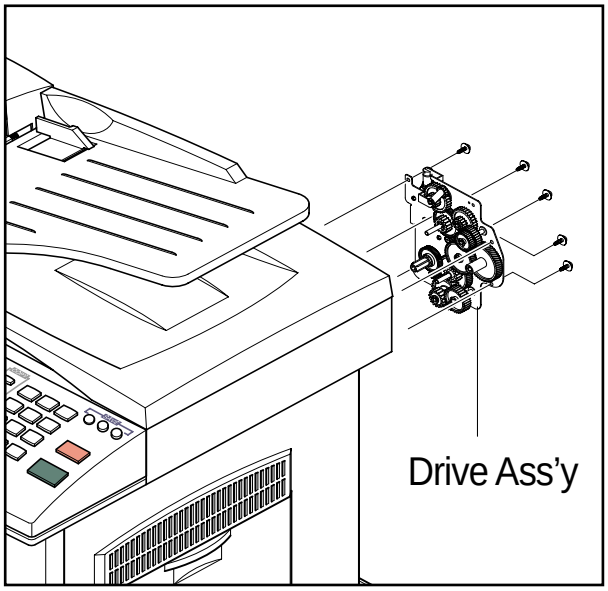
2. Unplug the two connectors.
   (Main Motor:9pin, Duplex Solenoid : 2pin)



3. Remove the one screw and take out the Fan and Dust Fan.



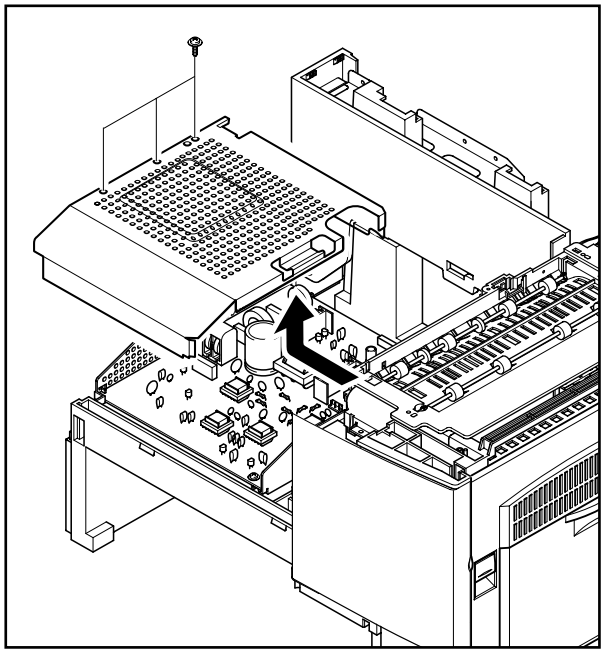
4. Remove the five screws and take out the Drive Ass'y.



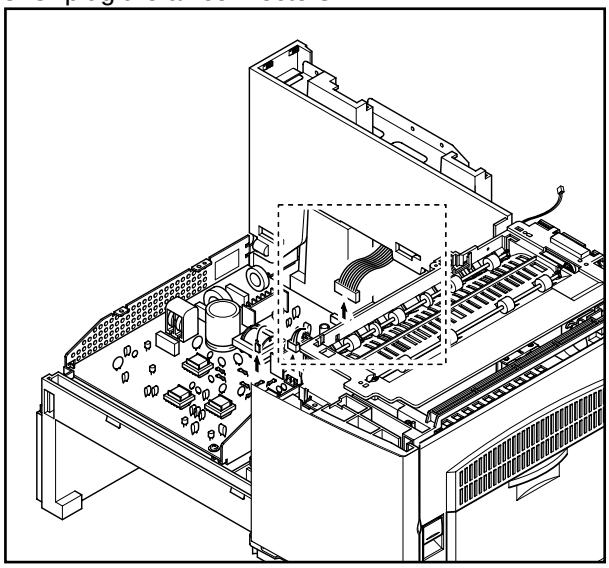
3-11 SMPS

1. Before you remove the LSU, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)
   - Cover Paper Exit Ass'y(see page 3-12)

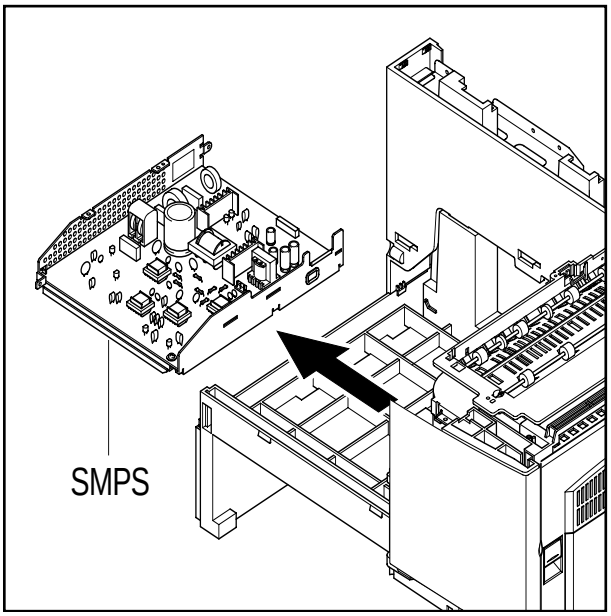
2. Remove three screws and take out the Shield SMPS Upper.



3. Unplug the all connectors.



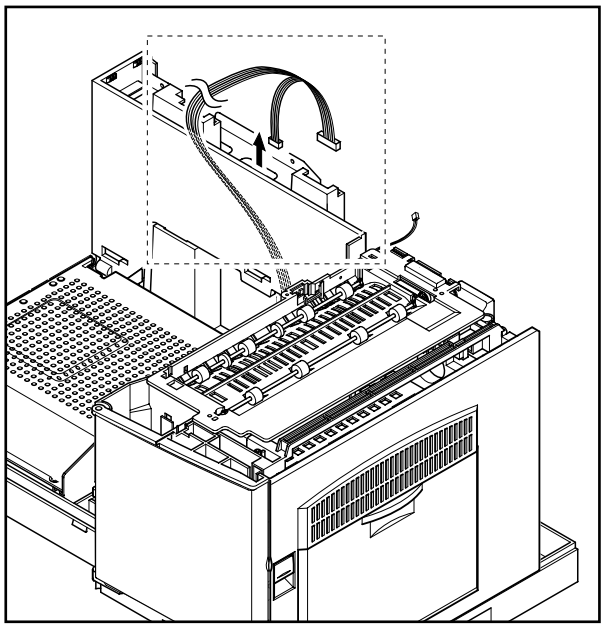
4. Remove the SMPS, as shown below.



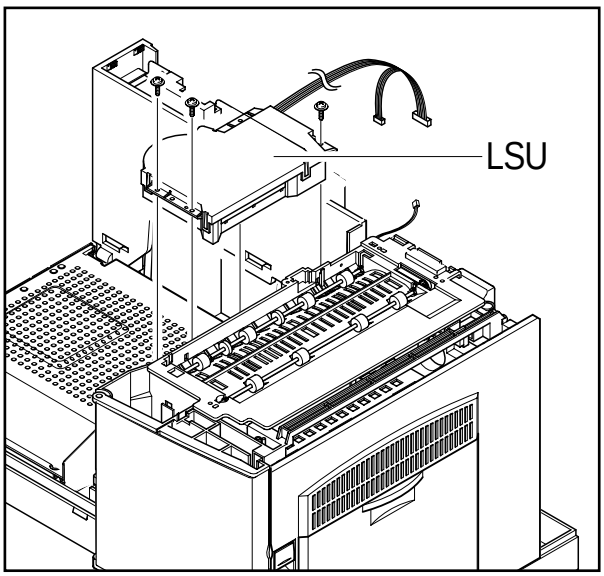
3-12 LSU (Laser Scaning Unit)

1. Before you remove the LSU, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)
   - Cover Paper Exit Ass'y (see page 3-12)

2. Unplug the two connectors.



3. Remove the three screws and take out the LSU.

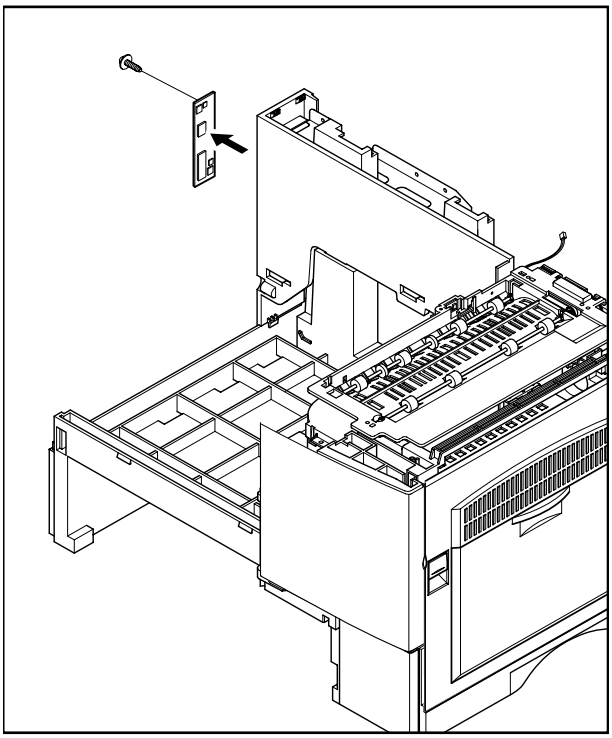


3-13 Cover Exit Rear

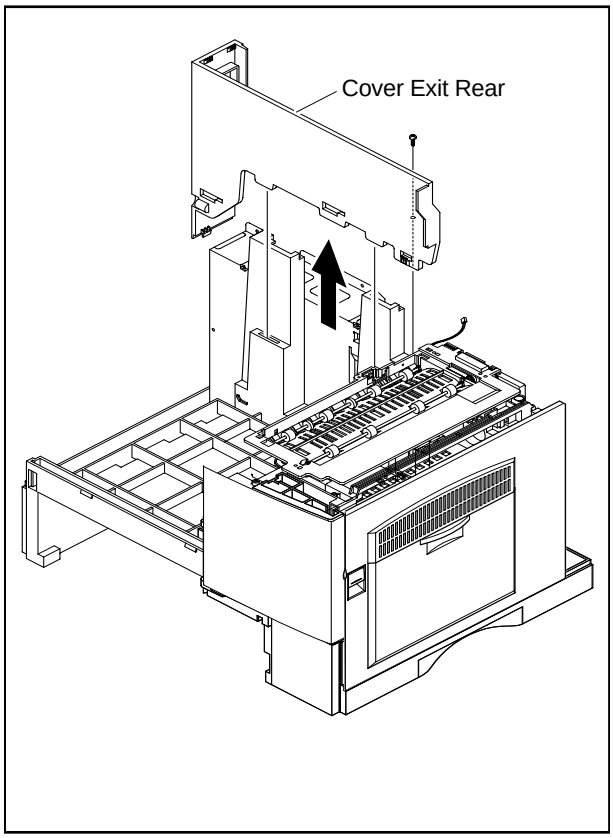
1. Before you remove the Cover Exit Rear, you should remove:

   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)
   - Exit Ass'y (see page 3-12)
   - Cover Paper Exit Ass'y(see page 3-12)
   - SMPS (see page 3-14)

2. Remove the one screw and take out the Panel Connect MPF.



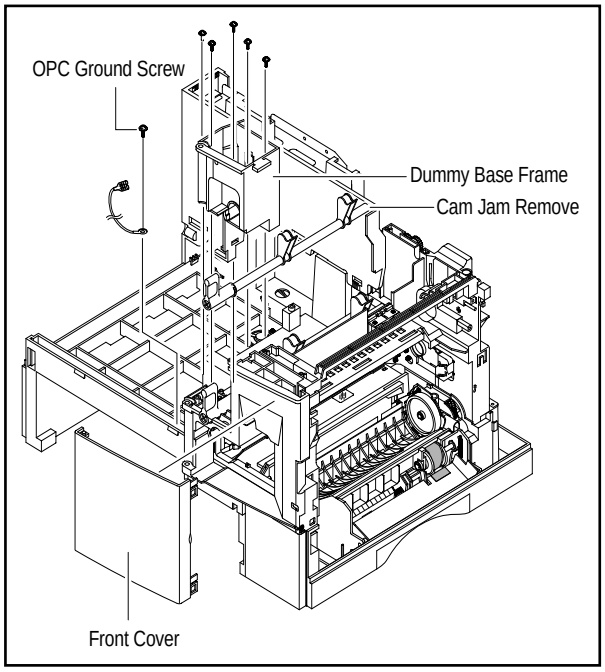
3. Remove the one screw and Cover Exit Rear, as shown below.



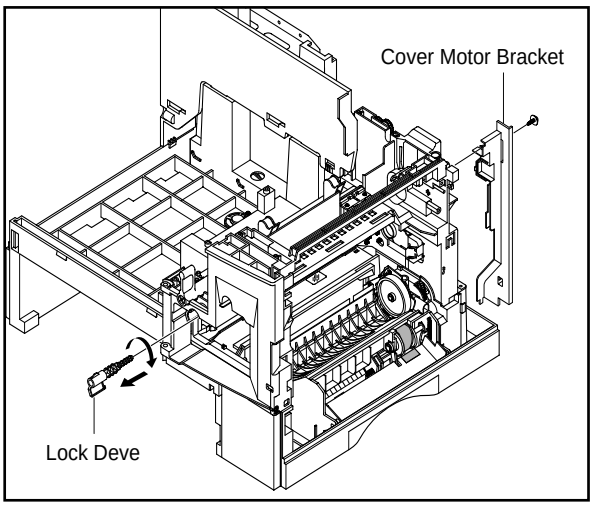
3-14 Main Frame Ass'y

1. Before you remove the LSU, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)
   - Side Cover Ass'y (see page 3-9)
   - Fuser (see page 3-11)
   - Exit Ass'y (see page 3-12)
   - Cover Paper Exit Ass'y(see page 3-12)
   - SMPS (see page 3-14)
   - LSU (see page 3-15)

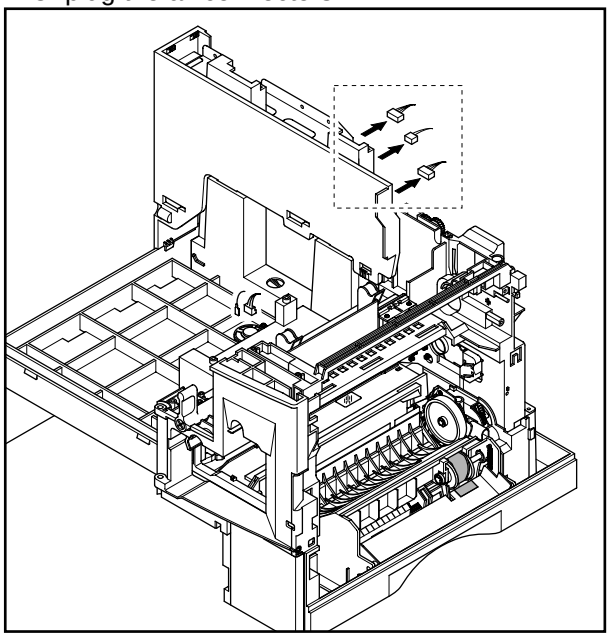
2. Remove the OPC Ground Screw (see diagram). Take care when re-assembling as if the thread is stripped the OPC ground may become intermittent causing print faults. Then remove the rest of the five screws to dissassemble the Dummy Base Frame, the Cover Front and the Exit Roller release cam.



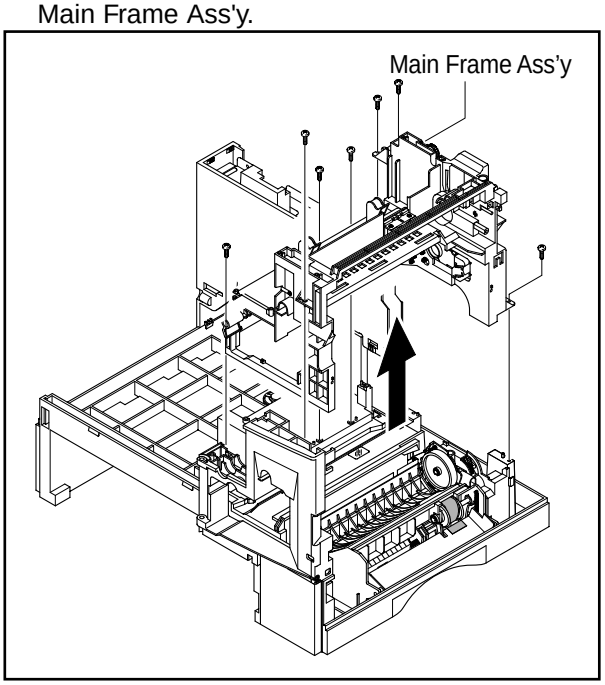
3. Remove the Deve Lock Lever, and then remove the one screw and the Cover Motor Bracket.



4. Unplug the all connectors.



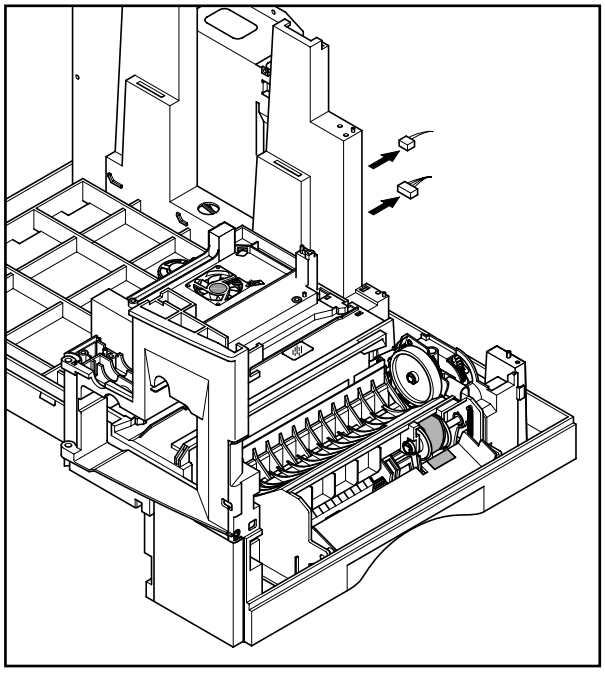
5. Remove the seven screws and take out the Main Frame Ass'y.



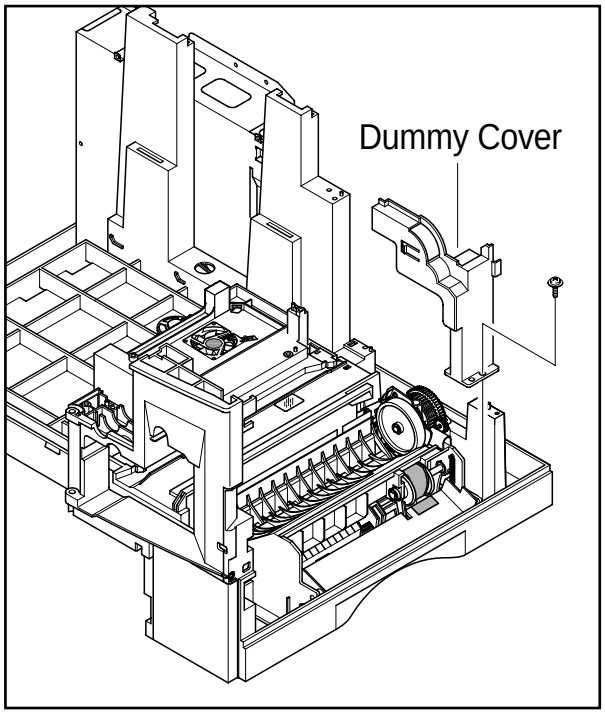
3-15 MP Ass'y

1. Before you remove the MP Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Shield Main Upper (see page 3-2)
   - Side Cover Ass'y (see page 3-9)

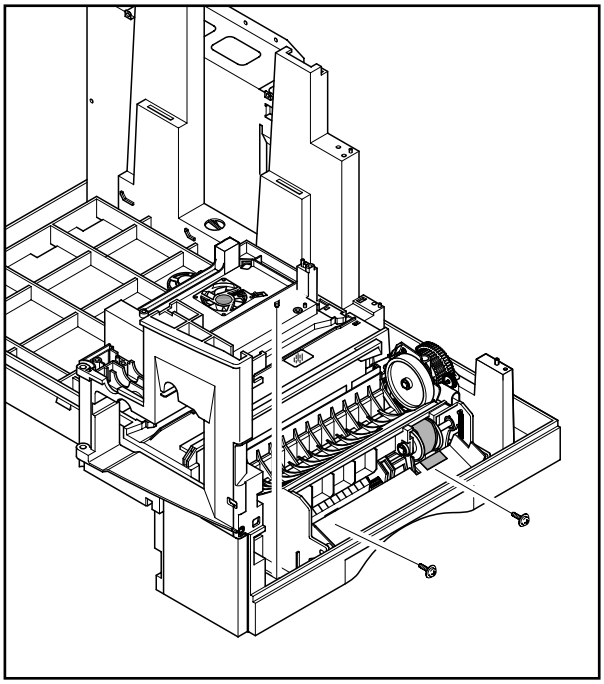
2. Unplug the two connectors.



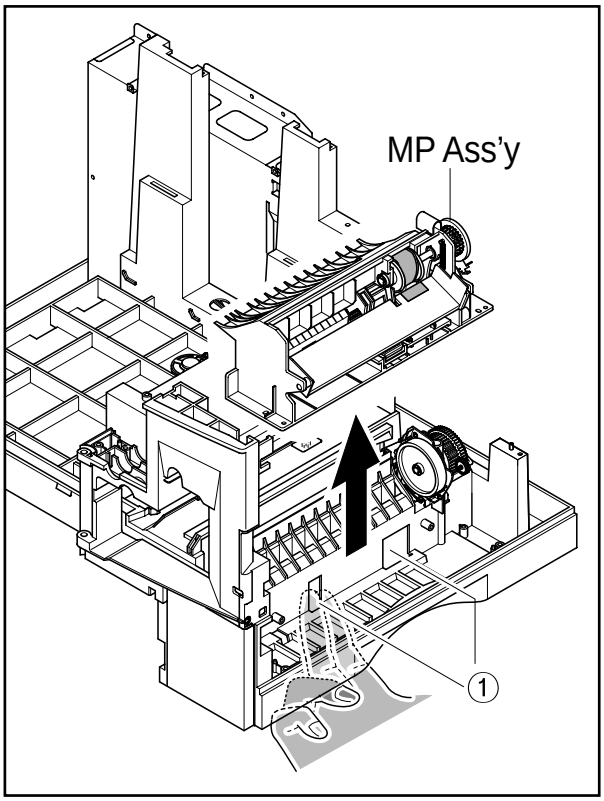
3. Remove the one screw and take out the Dummy Cover.



4. Remove the three screws.



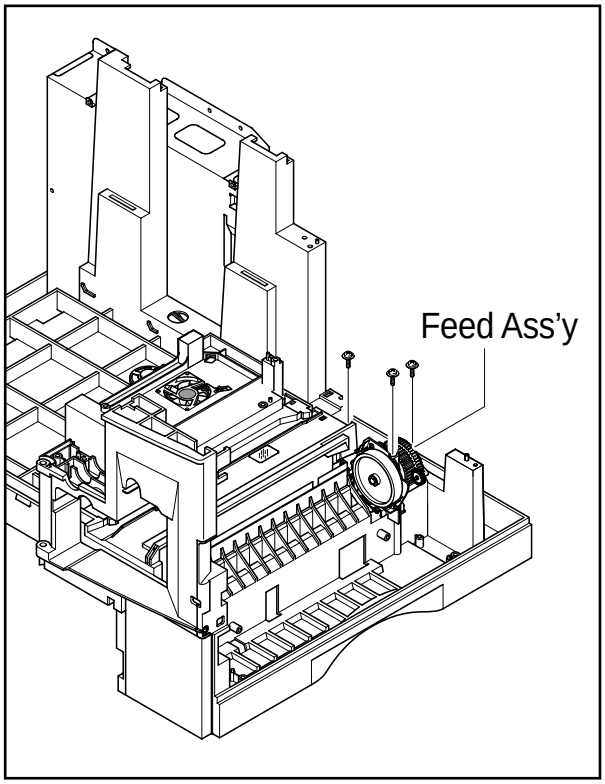
5. Release the SMPS fit. Pull the MP Ass'y upward and remove it.



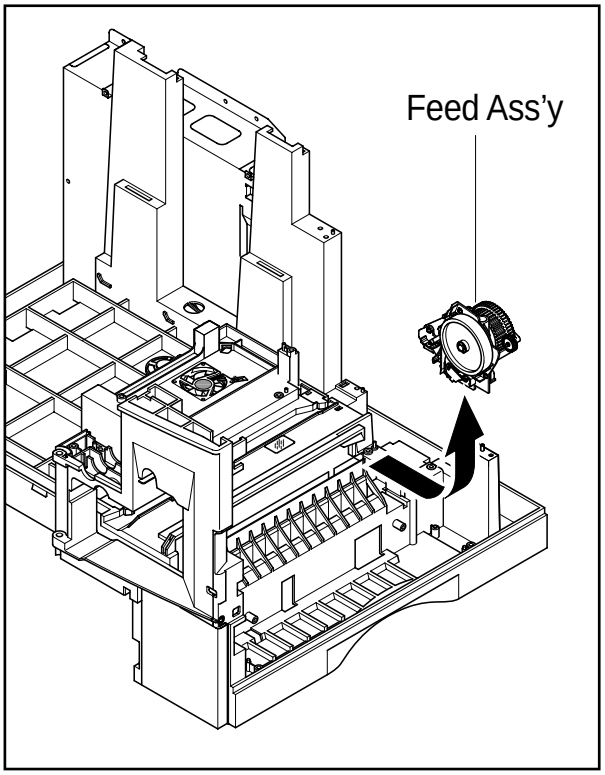
3-16 Feed Ass'y

1. Before you remove the Feed Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Scanner Ass'y (see page 3-2)
   - Side Cover Ass'y (see page 3-9)
   - Exit Ass'y (see page 3-12)
   - Cover Paper Exit Ass'y(see page 3-12)
   - LSU (see page 3-15)
   - Main Frame Ass'y (see page 3-17)

2. Remove the three screws.



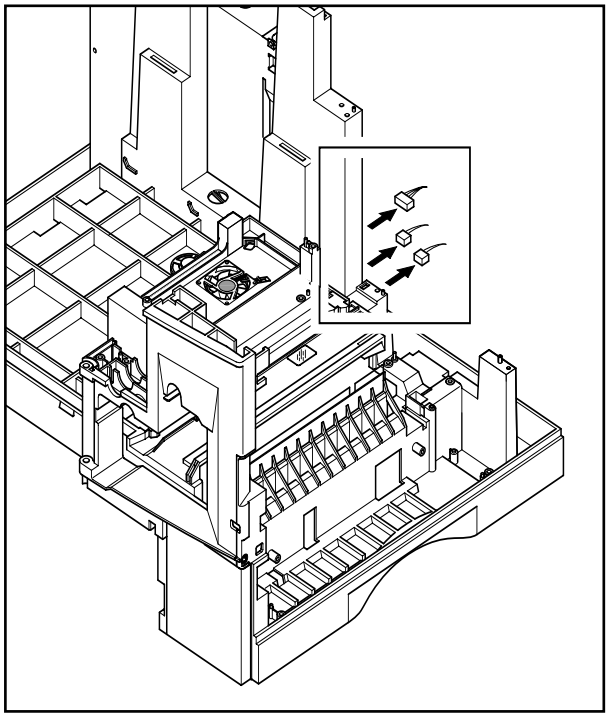
3. Pull the Feed Ass'y upward and remove it.



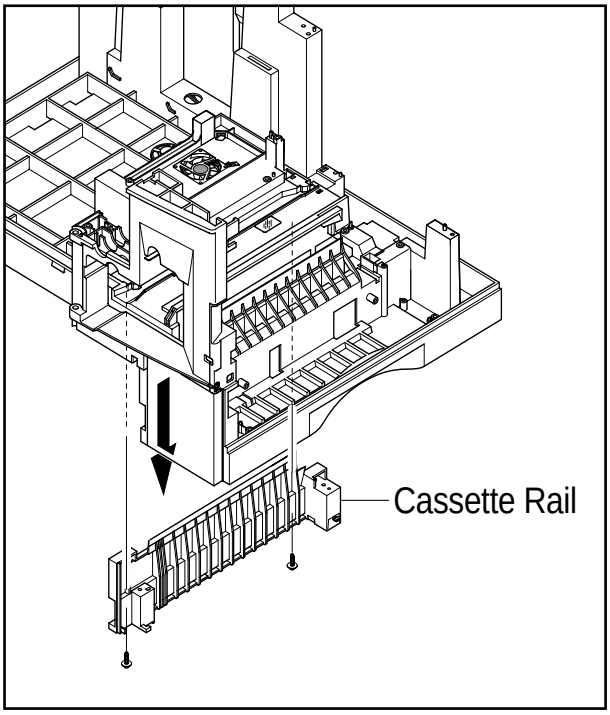
3-17 Pick Up Ass'y

1. Before you remove the Pick Up Ass'y, you should remove:
   - Rear Cover (see page 3-1)
   - Shield Main Upper (see page 3-2)
   - Drive Ass'y (see page 3-13)

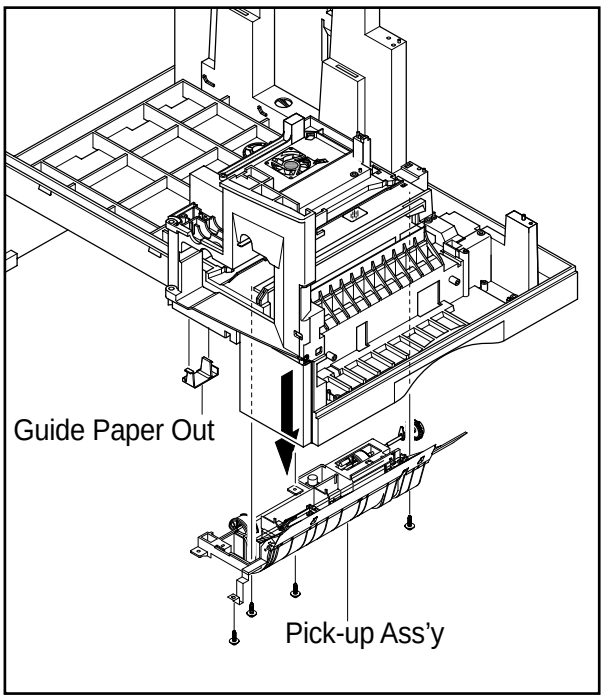
2. Unplug the three connectors.



3. Remove the two screws and take out the Cassette Rail.



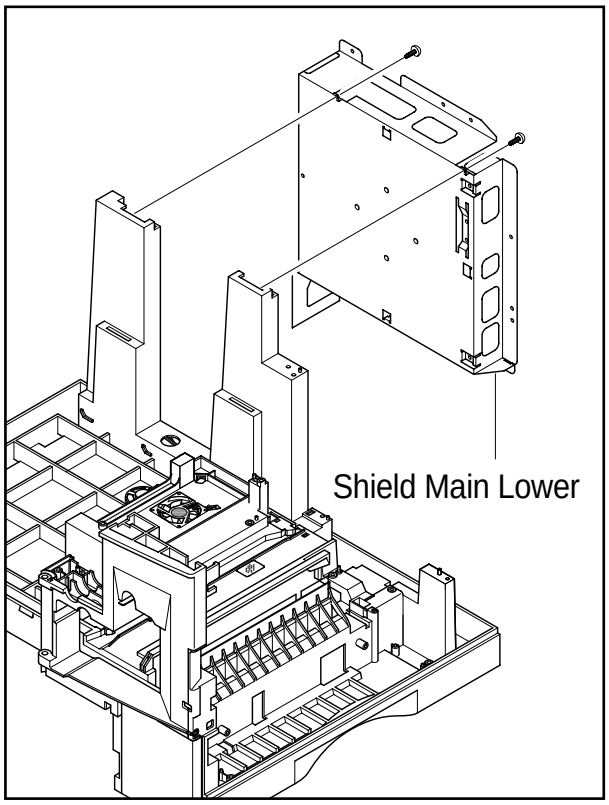
4. Remove the four screws and take out the Pick Up Ass'y, as shown below.



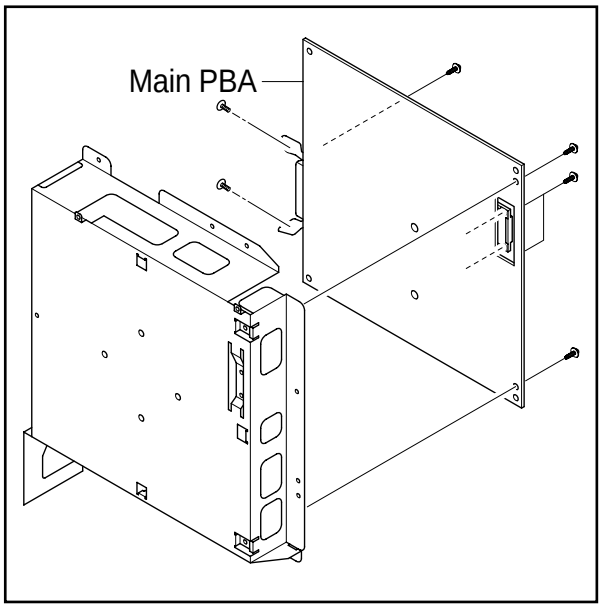
3-18 Main PBA

1. Before you remove the Main PBA, you should remove:
   - Rear Cover (see page 3-1)
   - Side Cover Ass'y (see page 3-9)
   - Cover Paper Exit Ass'y(see page 3-12)
   - SMPS (see page 3-14)

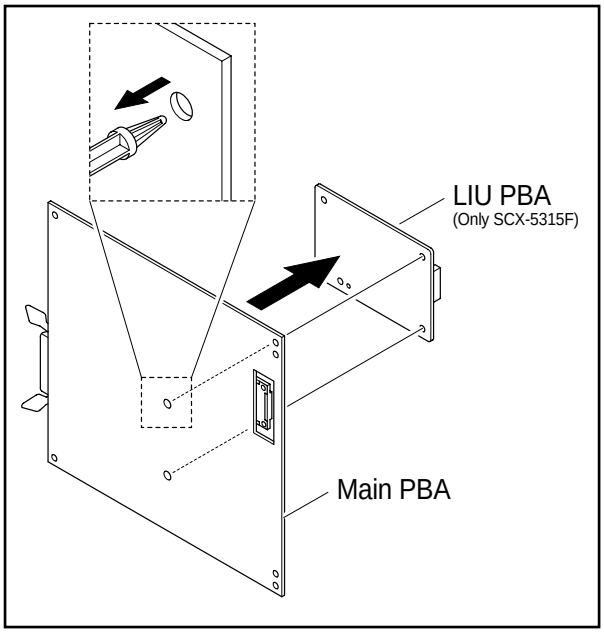
2. Remove the two screws and take out the Shield Main Lower.



3. Remove the five screws and take out the main PBA from the Shield Main Lower.



4. Remove the one screw and unlatch the LIU PBA securing the main PBA and remove it.



4. Maintenance & Troubleshooting

This chapter covers product maintenance, problem diagnosis and troubleshooting. It includes instructions for diagnosing and resolving print quality problems.
This service manual covers both the SCX5315F and SCX5115 models. SCX5115 has printer, copier and scanner functions. The SCX5315F has all of the features of the SCX5115 and in addition has Fax capabilities. The manual contents are primarily written for the SCX5315F, where there are differences between the two models this is highlighted.

4-1 Preventative Maintenance

The cycle period outlined below is a general guideline for maintenance.
The example list is for an average usage of 50 transmitted and received documents per day.
Environmental conditions and actual use will vary these factors.
The cycle period given below is for reference only.

COMPONENT	REPLACEMENT CYCLE
ADF Rubber	20,000 Pages
ADF Roller	50,000 Pages
Pick-up Roller	75,000 Pages
Transfer Roller	75,000 Pages
Fuser	75,000 Pages
Toner Cartridge	6,000 Pages
Drum Cartridge	15,000 Pages

4-2 Error Messages

Error Message	Description	Solution
RETRY REDIAL?	The machine is waiting for the programmed interval to automatically redial.	You can press START to immediately redial, or STOP to cancel the redial operation.
COMM. ERROR	A problem with FAX communications has occurred.	Try again.
DOCUMENT JAM	Loaded document has Jammed in the scanner document feeder	Clear the document Jam.
DOOR OPEN	The side cover is not securely latched	The side door and front door must be closed in the correct order. Open both doors. Close the front door first then close the side door.
GROUP NOT AVAILABLE	You have tried to select a group location where only a single location number can be used, such as when adding locations for a multi-dial operation.	Try again, check location for group.
LINE ERROR	Your unit cannot connect with the remote machine, or has lost contact because of a problem on the phone line.	Usually caused by a telephone line problem. Try again. If failure persists, wait an hour or so for the line to clear then try again
LOAD DOCUMENT	You have attempted to set up a sending operation with no document loaded.	Load a document and try again.
MEMORY FULL	The memory has become full.	Either delete unnecessary documents, or retransmit after more memory becomes available, or split the transmission into more than one operation.
NO ANSWER	The remote machine was not answered after all the redial attempts.	Try again. Make sure the remote machine is OK.
NO. NOT ASSIGNED	The speed dial location you tried to use has no number assigned to it.	Dial the number manually with the keypad, or assign the number.
NO PAPER [ADD PAPER]	There is no paper in the paper cassette. Printing stops until paper is loaded.	Re-load the paper cassette.
OVERHEAT	The printer part has overheated.	Your unit will automatically return to the standby mode when it cools down to normal operating temperature. If failure persists, call service.
PAPER JAM 0 OPEN/CLOSE DOOR	Recording paper has jammed in paper feeding area. Recording paper is jammed in pick-up unit	Press STOP and clear the jam.
PAPER JAM 1/2 OPEN/CLOSE DOOR	Recording paper has jammed inside the unit. Recording paper has jammed in paper exit unit.	Clear the jam.
TONER LOW	Toner cartridge is almost empty, or toner particles in the cartridge are unevenly distributed in the cartridge	Remove the toner cartridge and gently rock it from side to side. Try again. If problem persists replace the cartridge.
TONER EMPTY	Toner cartridge is now empty	Replace the Toner Cartridge.

Error Message	Description	Solution
DRUM WARNING	A warning that the OPC drum has almost reached the end of its life (14,000 Sides)	You have 1000 pages of print life left in the OPC Drum. Continue to use, order a new OPC drum.
REPLACE DRUM	OPC drum is now life-expired (15,000 sides)	Replace the OPC Drum Cartridge.
NO CARTRIDGE	When the machine detects that the toner cartridge has not been installed.	Install the Cartridge.
BYPASS JAM	Paper feed problem from the BYPASS (Manual feed) Tray.	Open the side Cover and clear the jam.
DUPLEX JAM	Paper feed problem in the duplex return path	Release Output Feed lever and check output area clear. Also open side door and check duplex unit is clear.
LINE BUSY	The remote FAX didn't answer	Try again.
OPEN HEAT EROR	No power to the Fuser lamp	Check thermostat, thermistor, fuser lamp and fuser connector and associated wiring. Also check the 'Fuser On' signal from main PWA to Power Supply. Check cable from Main PWA to Power Supply
Heating Error	During operation, Temperature does not go up	Check thermister contact point & Heating Lamp.
Scanner Locked	Scanner head does not move.	Check transit lock, check scanner cables are connected, check scanner home sensor, scanner motor or drive belt.

4-3 User Mode

The table below shows the settings and functions available in the User Mode. These are described in the user Guide. The table is given here to indicate possible settings that the user may have changed.

4-3-1 SCX-5315F

Function	Item	Content
SYSTEM DATA	CASSETTE PAPER	LETTER / A4 / LEGAL
	BYPASS PAPER	LETTER / A4 / LEGAL
	MESSAGE CONF.	ON / OFF / ERROR
	AUTO JOURNAL	ON / OFF
	RECEIVE CODE	0-9
	POWER SAVE	ON / OFF
	ECM MODE	ON / OFF
	RX REDUCTION	ON / OFF
	DISCARD SIZE	0-30mm
	REDIAL INTERVAL	1-15
	REDIALS	1-13
	ANSWER ON RING	1-7
	SEND FROM MEMORY	ON / OFF
	LOCAL ID	ON / OFF
	CLOCK MODE	12 / 24 HOUR
SYSTEM ID	FAX / ID	
DATE & TIME		
SYSTEM SETUP	PREFIX DIAL NO.	
	SECURE RECEIVE	
	RINGER VOLUME	LOW / HIGH (10 STEPS)
	ALARM SOUND	ON / OFF
	KEY SOUND	ON / OFF
	SPEAKER CONTROL	COM / ON /OFF
	SELECT LANGUAGE	ENG/GER/FRE/ITA/SPA/POR/DUT
	USB MODE	FAST / SLOW
	FAX DUPLEX	OFF / LONG EDGE / SHORT EDGE
	IMAGE QUALITY	NORMAL / TEXT / IMAGE
	SCAN SLEEP MODE HOME SET	
MEMORY CLEAR	SYSTEM ID	
	SYSTEM DATA	
	PHONE BOOK / MEMORY	
	TX-RX JOURNAL	
DELAY TX		
MEMORY TX		
PRIORITY TX		
POLLING		
ADD/CANCEL	ADD / CANCEL	
GROUP DIAL		

Function	Item	Content
MAINTENANCE	CLEAN DRUM	
	NEW DRUM	
	NOTIFY TONER LOW	ON / OFF
TX CONFIRM		
SCHEDULE JOB		
PHONE BOOK		
SYSTEM LIST		
TX JOURNAL		
RX JOURNAL		
HELP LIST		HELP LIST

4-3-2 SCX-5115

Function	Item	Content
SYSTEM DATA	CASSETTE PAPER	LETTER / A4 / LEGAL
	BYPASS PAPER	LETTER / A4 / LEGAL
	POWER SAVE	ON / OFF
	SELECT LANGUAGE	ENG/GER/FRE/ITA/SPA/POR/DUT
	USB MODE	FAST / SLOW
HELP LIST	HELP LIST	PRINTOUT
MAINTENANCE	CLEAN DRUM	
	NEW DRUM	
REPORTS	SYSTEM DATA	
	HELP LIST	HELP LIST

4-4 Tech Mode

4-4-1 How to Enter Service Mode

In service mode (tech) mode, the technician can check the machine and perform various tests to isolate the cause of a malfunction.

To enter the Tech mode, press **MENU, #, 1, 9, 3, 4** in sequence, and the LCD briefly displays ‘T’ or ‘TECH’, the machine has entered service (tech) mode.

While in Tech mode, the machine still performs all normal operations.

To return to normal user mode, press **MENU, #, 1, 9, 3, 4** in sequence again, or turn the power off, then on by unplugging and plugging the power cord.

Options changed while in service mode remain in effect until they are changed again or until you clear the machine’s memory.

4-4-2 Setting-up System in Tech Mode

4-4-2-1 SCX-5315F(SETUP : #, 1, 9, 3, 4)

Function	Item	Content
SYSTEM DATA	DIAL MODE	TONE / PULSE
	MODEM SPEED	
	ERROR RATE	5% /10%
	SET TX LEVEL	09-15
	SILENCE TIME	12 / NU / OFF
SYSTEM ID	The same as User Mode	
DATE & TIME	The same as User Mode	
SYSTEM SETUP	The same as User Mode	
MEMORY CLEAR	CLEAR ALL MEMORY	
DELAY TX	The same as User Mode	
MEMORY TX	The same as User Mode	
PRIORITY TX	The same as User Mode	
POLLING	The same as User Mode	
ADD/CANCEL	The same as User Mode	
GROUP DIAL	The same as User Mode	
MAINTENANCE	CLEAN DRUM	
	NEW DRUM	
	NOTIFY TONER LOW	ON / OFF
	SWITCH TEST	
	MODEM TEST	
	SRAM TEST	
	DRAM TEST	
	ROM TEST	FLASH / ENGINE
	PATTERN TEST	PATTERN1-7, QAPATTERN1-4, ALL"1-7 , ALL"
	CLEAR COUNT	PASSWORD **(1934)**
		CRU PRINTS COUNT
		FLT SCAN COUNT
		ADF SCAN COUNT
		USED DRUM COUNT
		USED TONER COUNT
		TOTAL PAGE COUNT
	ANSWER ON CNG	1-4
	ADJUST SHADING	
	FLASH UPGRADE	LOCAL
		REMOTE : USER PROGRAM ,
		EMULATION ,BOOT PROGRAM
	PROGRAM DIAL	
TX CONFIRM	The same as User Mode	
SCHEDULE JOB	The same as User Mode	
PHONE BOOK	The same as User Mode	
SYSTEM LIST	USER MODE	
TX JOURNAL	The same as User Mode	
RX JOURNAL	The same as User Mode	

Function	Item	Content
REPORTS	MSG. CONFIRM	
	SCHEDULE JOB	
	PHONE BOOK	
	SYSTEM DATA	
	TRANSMISSION	
	RECEPTION	
	HELP LIST	
	PROTOCOL	
	ERROR CODE	

4-4-2-2 SCX-5115(SETUP : #, 1, 9, 3, 4)

Function	Item	Content
SYSTEM DATA	CASSETTE PAPER	LETTER / A4 / LEGAL
	BYPASS PAPER	LETTER / A4 / LEGAL
	POWER SAVE	ON / OFF
	SELECT LANGUAGE	ENG/GER/FRE/ITA/SPA/POR/DUT
	USB MODE	FAST / SLOW
MAINTENANCE	CLEAN DRUM	
	MODEM TEST	
	NEW DRUM	
	SWITCH TEST	
	SRAM TEST	
	DRAM TEST	
	ROM TEST	FLASH / ENGINE
	PATTERN TEST	PATTERN1-7, QAPATTERN1-4 , ALL
	CLEAR COUNT	PASSWORD
		CRU PRINTS COUNT
		FLT SCAN COUNT
		ADF SCAN COUNT
		USED DRUM COUNT
		USED TONER COUNT
		TOTAL PAGE COUNT
	ADJUST SHADING	
	FLASH UPGRADE	
REPORTS	SYSTEM DATA	
	HELP LIST	HELP LIST
	ERROR CODE	

4-4-3 SYSTEM DATA

DIALING MODE

Select the dialing mode according to the user's line status.
TONE: Electrical type of dial
PULSE: Mechanical type of dial

SILENCE TIME

In ANS/FAX mode, after a call is picked up by the answering machine, the machine monitors the line. If a period of silence is detected on the line at any time, the call will be treated as a fax message and the machine begins receiving.
Silence detection time is selectable between limited (about 12 seconds) and unlimited time.
When '12 sec' is selected, the machine switches to receiving mode as soon as it detects a period of silence.
When 'unlimited'is selected, the machine waits until the answering operation is concluded even though a period of silence is detected. After the answering operation is concluded, the machine switches to receiving mode.

SEND FAX LEVEL

You can set the level of the transmission signal. Typically, the Tx level should be under -12 dBm.

Caution: The Send Fax Level is set at the best condition in the shipment from factory. Never change settings arbitrarily.

ERROR RATE

Tou can set the Error Rate between 5% and 10%. During operation the set monitors the rror rate.
When the rror rate approaches the preset value the machine automatically steps down the baude to 2400bps to ensure that the selected error rate is not exceeded.

MODEM SPEED

You can set the maximum modem speed. It is better left set 33.6Kbps (the default setting).
During call setup the baud rate is automatically adjusted to suite the slowest device. Only adjust this where the local line conditions are extremely poor.

4-4-4 MEMORY CLEAR

CLEAR ALL MEMORY

This function resets the system to its original factory settings. All settings entered in User Mode and Tech Mode are reset. This includes any User Phone Book entries, jobs stored in memory or received documents that have not been printed. If possible use the Control Panel software to download customer settings and phone book settings before carrying out a full reset.
When diagnosing or testing a faulty unit this function is often useful. Be aware that all error reports are also cleared.

< Method >

1. Select the [MEMORY CLEAR] in TECH MODE.
2. Push the ENTER button.
3. Select your country.
4. Push the ENTER button and all memory will be cleared.

NOTICE : Always perform a memory clear after replacing the main board or updating the firmware. Otherwise, the system may not operate properly.

4-4-5 MAINTENANCE

CLEAN DRUM

Use this feature to remove toner particles remaining in the OPC drum unit.
Use this feature when print quality falls or when marks or specks appear on the printout.
You should perform this feature several times until a clean printout appears.
The machine automatically pulls in a sheet of paper and prints out. Excess toner particles on the OPC drum surface are fixed to the paper.

FLASH UPGRADE

This function is used to update the system Firmware. There are 2 methods Local and Remote.
More information can be found in the firmware upgrade section.

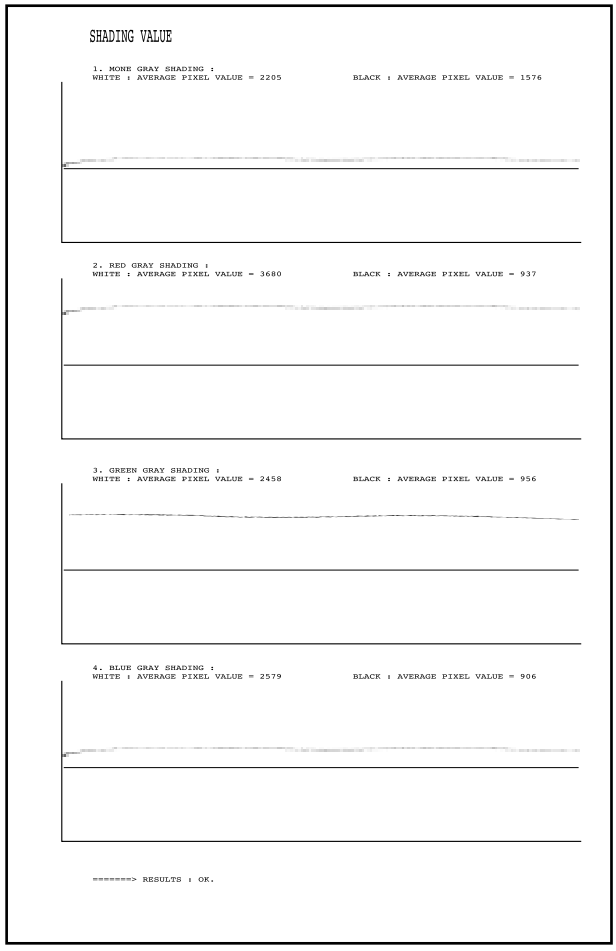
ADJUST SHADING

This option is used to test and check the functionality of the CCD (Charge Coupled Device). Use this when poor quality scanning or copying is reported.

< Method >

1. Select the [ADJUST SHADING] in TECH MODE.
2. Push the SET UP button. The unit scans a “white image” using the ‘white bar’
3. After the scan, CCD SHADING PROFILE similar to that shown will be printed out.
4. If the printed image is different to the image, if the lines are significantly lower or higher, or if there are high or low spots in the chart then the CCD is defective.

NOTICE : When you test the CCD, make sure that the cover is closed.”


SHADING VALUE
1. MONE GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 2205
BLACK : AVERAGE PIXEL VALUE = 1576
2. RED GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 3680
BLACK : AVERAGE PIXEL VALUE = 937
3. GREEN GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 2458
BLACK : AVERAGE PIXEL VALUE = 956
4. BLUE GRAY SHADING :
WHITE : AVERAGE PIXEL VALUE = 2579
BLACK : AVERAGE PIXEL VALUE = 906
=======> RESULTS : OK.

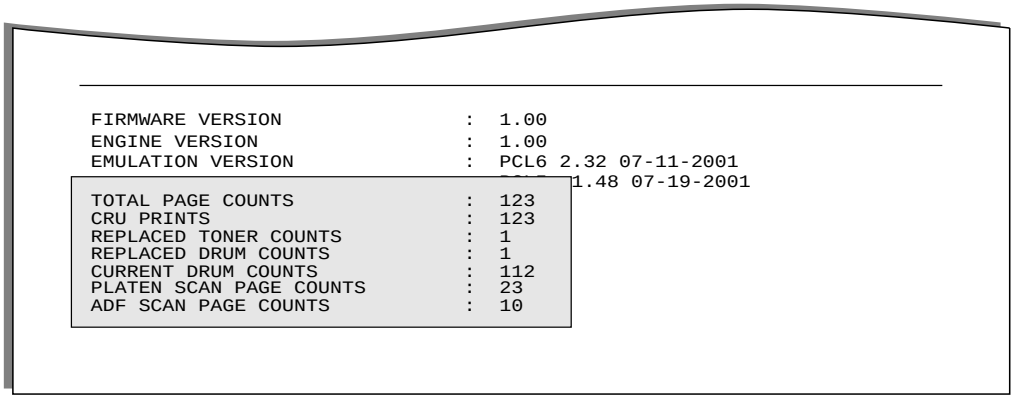
ANSWER ON CNG

The function is to control the CNG TONE recognition times for entering receiving mode from the AUTO MODE or ANS/FAX MODE.

CLEAR COUNT

This function erases the counters stored in system memory. These are shown in the highlighted area in the Sytem data List shown below (printed in TECH MODE)

Note the Current Drum Page Count cannot be erased. This is cleared using the NEW DRUM function (USER MODE ⇒ MAINTENANCE ⇒ NEW DRUM)"


FIRMWARE VERSION : 1.00
ENGINE VERSION : 1.00
EMULATION VERSION : PCL6 2.32 07-11-2001
1.48 07-19-2001
TOTAL PAGE COUNTS : 123
CRU PRINTS : 123
REPLACED TONER COUNTS : 1
REPLACED DRUM COUNTS : 1
CURRENT DRUM COUNTS : 112
PLATEN SCAN PAGE COUNTS : 23
ADF SCAN PAGE COUNTS : 10

< SYSTEM DATA LIST >

PATTERN TEST

Using this pattern printout, you can check if the printer mechanism is functioning properly.
It is used in the production process and is not intended for Service use."

ROM TEST

Use this feature to test the machine'S ROM. The result and the software version appear in the LCD display.

- FLASH VER : 1.00 V
- ENGINE VER :1.00V

DRAM TEST

Use this feature to test the machine's DRAM. The result appears in the LCD display.
If all memory is working normally, the LCD shows << O K >>

SRAM TEST

Use this feature to test the machine's SRAM. The result appears in the LCD display.
If all memory is working normally, the LCD shows << O K >>

MODEM TEST

Use this feature to hear various transmission signals to the telephone line from the modem and to check the modem. If no transmission signal sound is heard the modem may be faulty."

SWITCH TEST

Use this feature to test all keys on the operation control panel. The result is displayed on the LCD window each time you press a key.

NOTIFY TONER LOW

With this feature enabled, when the toner becomes low, the toner low information will be sent to a specified contact point, for example, the service company. After you access this menu, select ON, and when the LCD-prompts, enter the name and the number of the contact point, the customer's fax number, the model name, and the serial number.”

PROGRAM DIAL

This is a special feature which allows the TECH USER to set parameters for a specific dialed location (which must be in the one touch or speed dial phone books). Parameters can be set to override the normal; default settings to enable the machine to cope with calls to destinations with known line problems”

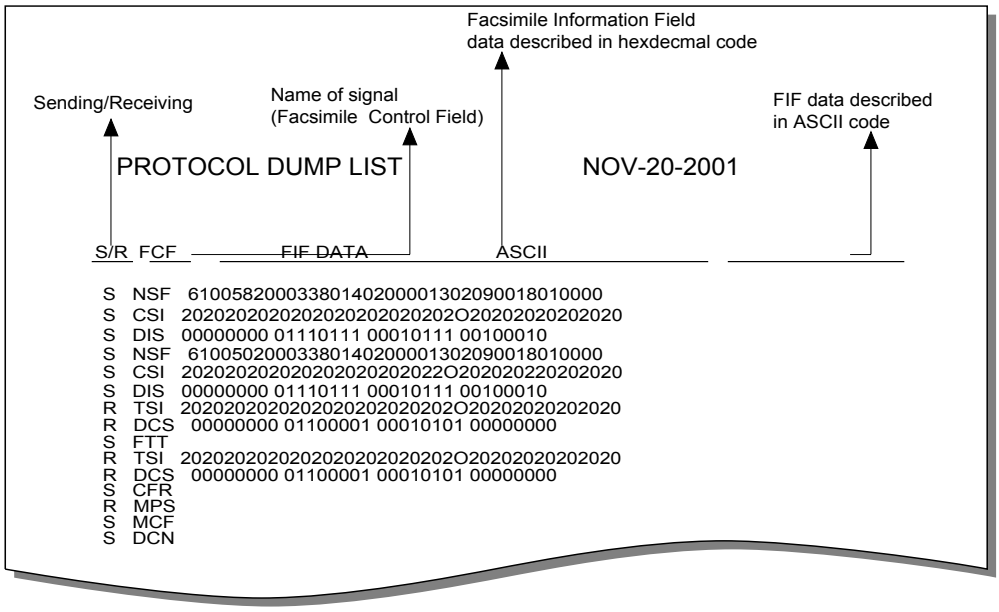
4-4-6 REPORT/HELP

MSG. CONFIRM

It shows the result of the last send operation.

PROTOCOL LIST

This list shows the sequence of the CCITT group 3 T.30 protocol during the most recent sending or receiving operation. Use this list to check for send and receive errors. If a communication error occurs while the machine is in TECH mode, the protocol list will print automatically.



HELP

It shows a brief description on the machine's basic functions and commands.
Use it as a quick reference guide

RECEPTION

This journal shows information relating to document reception, the time and dates of up to 40 of the most recent documents received are stored.

TRANSMISSION

This journal shows information relating to document transmission, the time and dates of up to 40 of the most recent documents transmitted are stored.

SYSTEM DATA

This list provides a list of the user system data settings and tech mode settings.

PHONEBOOK

It lists all telephone numbers that have been stored in the machine.

SCHEDULE JOB

This list shows information relating to the documents currently stored for delayed transmission. It provides the operation number, starting time, type of operation, etc.

ERROR CODE

This list shows a list of errors that have occurred since the last memory clear.

4-4-7 Firmware Upgrade

This function is used to update the machines Firmwar, there are two Upgrade methods - local and remote.

4-4-7-1 Local Machine

RCP(Remote Control Panel) mode

This method is used with the machine connected using either a Parallel Port or USB Port to a PC and uses the RCP (Remote Control Panel) software to upgrade the Firmware.

< Method >

How to Update Firmware using RCP

1. Connect PC and Printer with Parallel Cable or USB Cable.
2. Execute RCP and select Firmware Update. Current Firmware version and Emulation Version are displayed on Current version window.
3. The Firmware file must be stored on the PC, in a path close to the root of C:, ie C:\TEMP. Search for the firmware file to use to update the machine by using the Browse Icon.
4. Click the Update icon, the firmware file is transmitted to the Printer automatically and the printer is initialized when the update is finished.
5. Click the Refresh icon and check that the version number displayed matches the new firmware just loaded."

DOS Command mode

This method is just for Parallel Port. Connect to PC with Parallel cable and enter DOS Command to upgrade the Firmware.

< Method >

a). You will need the following files:- **down.bat, down_com.bin, fprt.exe,** and "**Rom File**": this is the firmware file to be loaded into the printer. Save the files in the same folder, close to the root of C;, e.g. C\TEMP

b). At a DOS prompt, input one of the commands shown below and press the enter key. The file will then be sent automatically to the printer.

c) There are two commands use the correct one depending on the printer status.

* when the printer is in the user mode and is in the normal ready condition: **down "rom file"**
* When the product is been placed in the upgrade mode (TECH MODE → MAINTENANCE → FLASH UPGRADE → LOCAL) **fprt "rom file"**

d) Do not turn off the power while the upgrade is in process."

4-4-7-2 Remote FAX

This function uses one fax machine already loaded with the latest firmware to upgrade one or more other remote machines of the same type using the telephone network.

< Method >

1. Operate a fax with the latest firmware to prepare it to send the upgrade. (TECH MODE MAINTENANCE FLASH UPGRADE REMOTE)
2. Input the telephone number of the fax machine to be upgraded. (Several faxes can be upgrade at the same time. In this case, enter the telephone number for each machine.)
3. Then press the enter button, this will send the firmware file by calling to the each of the selected fax machines in turn. (Around 10~15 minutes is needed to send the file to each machine.)

< Caution >

1. The sending and receiving fax machines must be the same model.
2. A sending fax must be set up as ECM mode, and the receiving machine memory must be set up as 100%. If not the upgrade will fail."

4-4-8 Identify Sale Date(Only SCX-5315F)

This function confirms the date that the consumer first uses the product. The date stored is the date of the first scan or first print whichever operation the user carries out first.
This information is retained even after a memory delete (Clear All Memory).

< Method >

Press MENU, #, 1, 9, 3, # in sequence. The Firmware version is displayed on the LCD.

Press 1(in the number keypad) : The LCD display shows "Updated date"
Press 2(in the number keypad) : The LCD display shows "Product first use date"

4-5 ENGINE TEST MODE

The Engine Tests Mode provides useful test functions for checking the status of the print engine.
It can test many of the separate sections of the print engine and displays the result of the test on the LCD.
These tests are classified in 6 groups (0~5), and the functions of these tests are shown below.

4-5-1 To enter the Engine Test Mode

Press **MENU, #, 1, 9, 3, 1** in sequence, and the LCD briefly displays 'Engine Test Mode', the machine has entered service (tech) mode.

4-5-2 Diagnostic

No.	Sub No.	Engine test	Remark
0	1	Motor Test	1: On, 2: Off
	2	PTL Test	1: On, 2: Off
	3	Fan Test	1: On, 2: Off
	4	Fuser Test	1: On, 2: Off If its temperature is lower than the Standby (160˚C), the fuser is on, but if it is higher than the Standby, the fuser is off.
1	1	LSU Motor Test	1: On, 2: Off
	2	LSU Hsync Test	1: On, 2: Off
	3	LD On Test	1: On, 2: Off
	4	LSU Operation	1: On, 2: Off
2	1	Feed Sensor Test	Sensor On : FEED SENSOR ON Display
			Sensor Off : FEED SENSOR OFF Display
	2	Exit Sensor Test	Sensor On : EXIT SENSOR ON Display
			Sensor Off : EXIT SENSOR OFF Display
	3	Cover Sensor Test	Sensor On : COVER SENSOR ON Display
			Sensor Off : COVER SENSOR OFF Display
	4	1'st Empty Test	Sensor On : 1'st PAPER Empty Display
			Sensor Off : 1'st PAPER No Empty Display
	5	MP Empty Sensor Test	Sensor On : MP PAPER Empty Display
			Sensor Off : MP PAPER No Empty Display
	6	BIN FULL Sensor Test	Sensor On : BIN FULL SEN ON Display
			Sensor Off : BIN FULL SEN OFF Display
3	1	1'st CAST Solenoid Test	1: On, 2: Off
	2	MP Solenoid Test	1: On, 2: Off
	3	Duplex Solenoid Test	1: On, 2: Off
4	1	MHV Test	1: On, 2: Off (-1450v)
	2	DevBias Test	1: On, 2: Off (-450v)
	3	THV EN/NEG Test	1: On, 2: Off
	4	THV Test	1: On, 2: Off (1300v)
	5	THV Trigger Test	1: On, 2: Off
5	1	CRU Error Check	1: Check, 2: Next
	2	New OPC Check	1: Check, 2: Next
6	1	All Function Test	For SMD Test, Push up key : Next function All Function : No.0~4

4-5-3 ENGINE PRINT

When the function is enabled a group of parameters are printed at the bottom of each page which define the print engine condition. It is a manufacturing test feature not intended for service use.
This setting remains enabled even when you exit from Engine Mode. Remember to turn it off.

4-6 Troubleshooting

4-6-1 Scanner

4-6-1-1 COPY

PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
White copy	• Ensure the Scanner cover is closed.	• Room lighting can penetrate thin paper causing quality problems
	• Check shading profile	• Carry out the “Adjust Shading” procedure in Tech mode
Black copy	• Check the CCD problem in Main PBA.	• Check the CCD harness contact.
	• Check shading profile.	• Remake shading profile in the tech mode.
Defective image quality	• Check shading profile.	• Carry out the “Adjust Shading” procedure in Tech mode
	• Check the original is laying flat on the scanner glass.	• A gap above 0.5mm can cause a blurred image.
	• Check printing quality.	• See “Print” troubleshooting.
Abnormal noise	• Check the Scanner drive mechanism.	• Check scanner carriage, motor, gearbox, belt and belt tension spring
	• Check the Motor Driver chip on the driver PBA.	• If any driver is defective, replace it. - U2-4, 11, 18, 25 signals swing between OV and 24V when operating.

4-6-1-2 PC-Scan

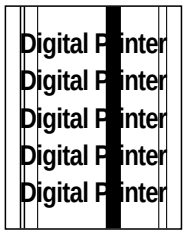
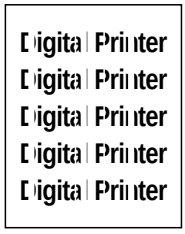
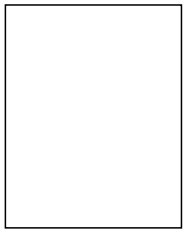
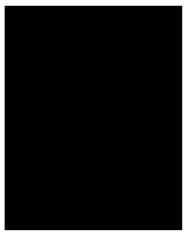
PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
Scanning Error	• Check the printer cable is correctly installed.	• Use standard IEEE1284 cable.
	• Check that the TWAIN driver is installed.	• Remove any other scanner driver. • Reboot after reinstallation of the TWAIN driver.
	• Check the printer port (Parallel) BIOS settings.	• Check the parallel-port-related items in the CMOS Setup. As a printer port, ensure ECP is selected.
	• Check harness contact.	• Check CN12 contact in Main PBA
	• Check the IEEE1284 signal levels.	• If any signal level is defective, replace driver PBA. - U33-26, 27, 28, 43, 44, 45, 46, 47 on Main PBA are 0.8V to 2.4V TTL signal. • Otherwise, replace Main PBA.
	• Check the USB signal level.	• If USB signal level is defective, replace Main PBA.
Defective image Quality	• Check shading profile.	• Remake shading profile in the tech mode.
	• Check the gap between original and scanner glass.	• The gap above 0.5mm can cause a blurred image.
Abnormal noise	• Check the Scanner Motor and any mechanical disturbance.	• Check the right position of the Scanner Motor, and check the any mechanical disturbance in the CCD carriaging part.
	• Check the motor driver in Driver PBA.	• If any driver is defective, replace it. - U2-4, 11, 18, 25 = 0V to 24V swing signal when operating.

4-6-2 FAX(only SCX-5315F)

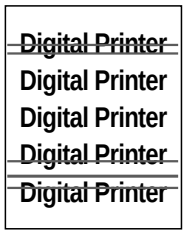
4-6-2-1 FAX/TELEPHONE Precautions

PROBLEM	ITEMS TO BE CHECKED.	HOW TO SOLVE
TEL LINE CANNOT BE ENGAGED (NO DIAL TONE)	• When you press " OHD" key: a) Check line cord connection. b) Check MAIN LIU harness, and CN1 (LIU PBA). c)Check relay operation of LIU PBA : Is the control signal of CN18(main) low?	a) insert it correctly into the connection jack called "line". b) Replace defective parts. c) Replace main PBA IF the control signal of CN18(main) is high. Replace LIU PBA if high but phone line cannot be connected.
Cannot MF dial	• Check CN18 (main PBA), MAIN-LIU harness, and CN1 (LIU PBA)	• Replace defective parts.
MF dial is possible but not DP dial.	• Check DP control signal of CN18-11 of MAIN PBA and the circuit around R15. U6 and Q2 of Liu PBA.	• Replace LIU PBA.
Defective fax transmission	• Check CN18 (main PBA), MAIN LIU harness, and CN1(LIU PBA). • Is the external phone hooked off? • Check 'hook off' : Refer to 'TEL LINE CANNOT BE ENGAGED' above. • Check transmission path : Check output of CN20-3.4 and T2-4(LIU PBA). • Check reception path : Check output CN1-1 (LIU PBA) and input of CN18-1 (main PBA).	• Replace defective parts. • Replace LIU PBA if low. • Refer to 'TEL LINE CANNOT BE ENGAGED' above. • Replace main PBA, if abnormal. • Replace LIU PBA if CN1-1(LIU PBA) is not confirmed. Replace main PBA if CN20-1(MAIN PBA) is not confirmed.
Defective automatic fax reception	• Is the ring checked? Check ring pattern at CN1-9 (LIU PBA). • Refer to 'Defective Transmission.'	• Replace LIU PBA if it cannot be checked. • Refer to 'Defective Transmission'.

4-6-3 Print Quality

Error Status	Check	Solution
Vertical black line and band 	1. Faulty Toner cartridge 2. LSU 3. Bad cleaning blade of drum cartridge.	1. Change Toner cartridge 2. Replace LSU 3. Chang Drum cartridge.
Vertical white line 	1. LSU window contamination 2. Toner cartridge	1. Clean LSU window 2. If not LSU, change Toner cartridge.
No image 	1. OPC is properly grounded? 2. LSU running well? 3. Bias voltage is correct? 4. Toner low? 5. Is there video data from Main PBA	1. Measure the resistance between frame ground and the OPC ground spring attached to the frame. Confirm good ground. If faulty check ground path through the frame . Also check OPC Ground Screw – see page 3-18 2.Adjust LSU or replace it 3. Normal Dev bias = -440V 4. Shake toner cartridge and print. If an image appears toner is empty 5. Print engine test pattern , replace Main PBA
Light image 	1. LSU light power normal? 2. Enough toner? 3. High charger voltage? 4. Lower bias voltage 5. Contamination of high voltage contact. 6. Transfer voltage and roller.	1. Checking LSU light power is difficult. Compare with new one and check. 2. Check toner and developer counter 3~4. Change the HVPS Board. 5. Stray toner can increase contact resistance and cause a bad contact. Clean contaminated area.
Dark image 	1. LSU light power normal? 2. Bias voltage output is high? 3. Video data is always supplied? 4. Bad C/R voltage contact.	1. Checking LSU light power is difficult. Compare with new one and check. 2. Normal Dev bias = -350V 3. Check Video Data signal(CN2). Replace main PBA board. 4. Replace Drum Cartridge or check where is bad point of machine.

Error Status	Check	Solution
Background 	1. High voltage output is normal? 2. C/R of Toner cartridge is contaminated?	1. Change the HVPS Board. 2. Print a number of “Cleaning” sheets – if problem persists change the cartridge..
Ghost 	1. High voltage output. 2. Pre-Transfer Lamp. 3. Bad high voltage contact.	1. Change the HVPS Board. 2. Check PTL lamp comes on –replace if necessary 3. Clean the inside machine or replace toner cartridge.
Stains on back of paper	1. Contamination of transfer roller. 2. Toner debris in paper path 3. Pressure roller contamination	1. Clean the transfer roller with vacuum cleaner. 2. Clean the paper path with a cloth or air duster. 3. Remove fuser and replace it.
Poor Fusing	1. Paper quality and finish? 2. Check fusing temperature. 3. The machine was kept at a low temperature for a long time?	1. Should use recommended paper. 2. Check engine controller board. If you do not have a thermometer, measure the thermistor voltage to CPU, If 2.3V±5% when printing is correct therwise disassemble fthe user and check the thermistor contacts and thermistor. 3. Re-check after allowing the machine to come up to room temperature.
Partial blank image (not periodic)	1. Toner is low? 2. The toner cartridge is out of position?	1. Replace Toner cartridge. 2. Checkand adjust.
Partial blank image (periodic)	1. repatative white or black marks at regular intervals.	Measure the spacing of the marks and compare the spacing to those given in the table below. • Spacing 1 and 2 – Replace the OPC • Spacing 3 and 4 – replace the toner car tridge • Spacing 5 – replace the transfer roller • Spacing 6 and 7 – replace the Fuser.

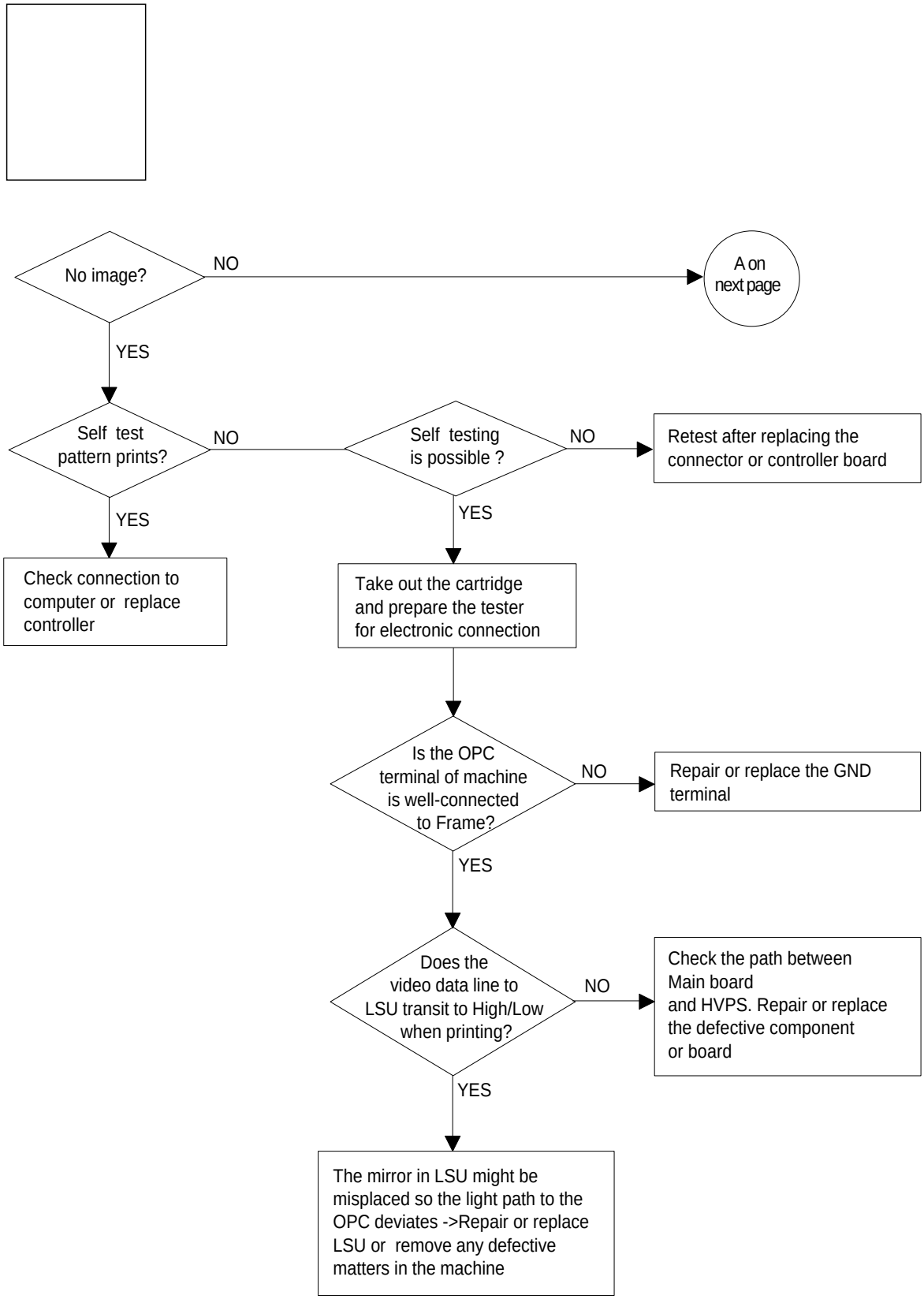
Error Status	Check	Solution
Different image density (left and right)	1. Uneven pressure between Charge roller and OPC Drum 2. Uneven pressure between Dev roller and OPC drum 3. Transfer roller's pressure force uneven at each side	1. Change OPC cartridge 2. Change toner and / or OPC Drum 3. Check left and right transfer roller springs
Horizontal lines or bands 	1. Bad contact on high voltage terminal 2. Contamination of charge roller 3. Contamination of heat roller 4. Malfunction of LSU	1. Clean each contact and check continuity 2. Print several "cleaning sheets" – replace OPC drum if problem persists. 3. Replace fuser unit 4. Check Main PBA., LSU harness and LSU

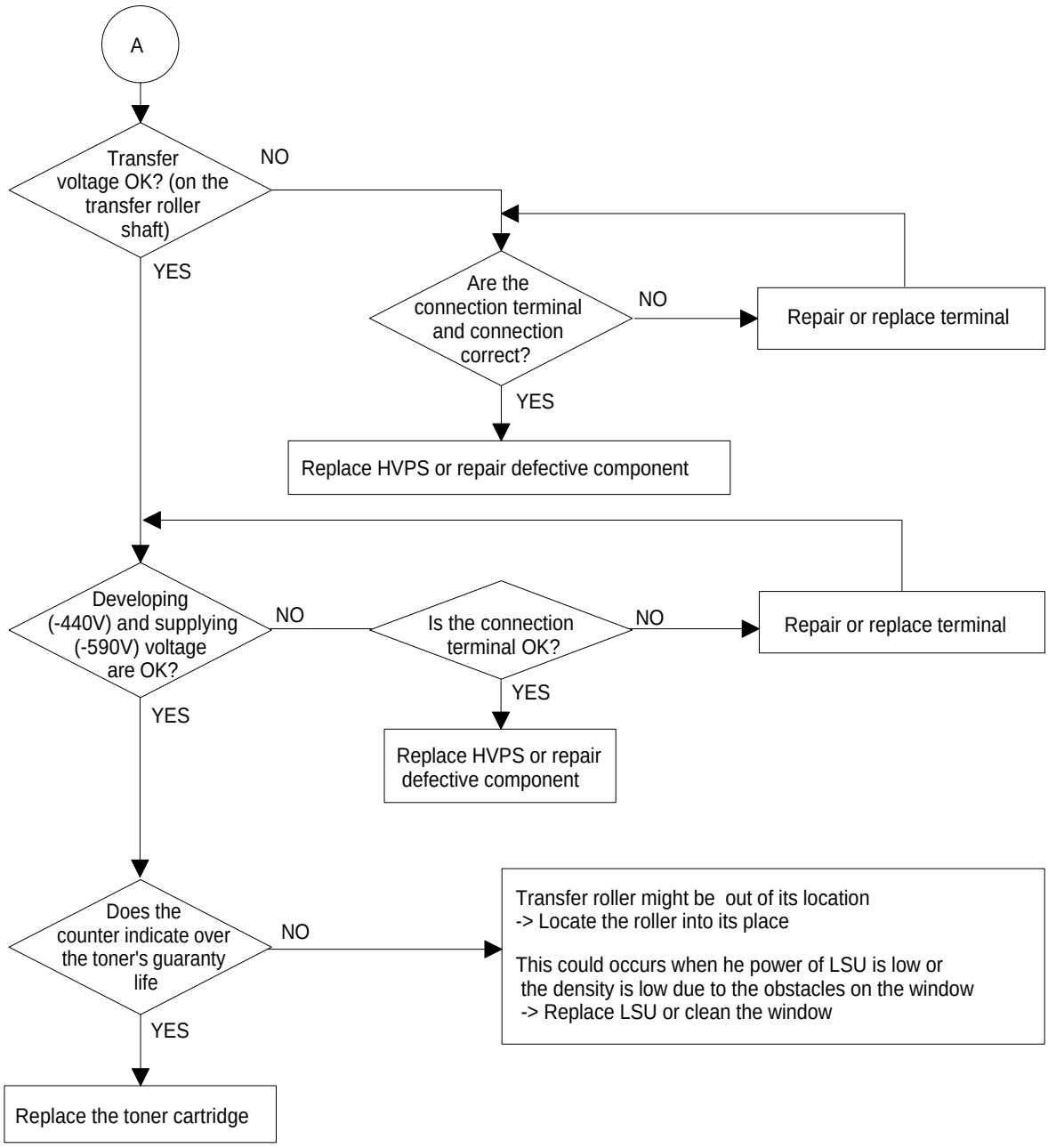
Abnormal Image Printing and Defective Roller

If abnormal image prints periodically, check the parts shown below.

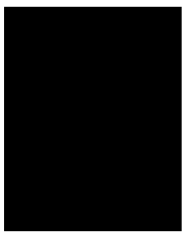
NO	Roller	Abnormal image period	Kind of abnormal image
1	OPC Drum	94.3 mm	White spot. Black spot
2	Charge Roller	37.7 mm	White spot. Black spot
3	Supply Roller	35.8 mm	Horizontal dark band
4	Develope Roller	44.8 mm	Horizontal dark band
5	Transfer Roller	56.6 mm	Contamination on reverse side of paper / transfer fault
6	Heat Roller	82.5 mm	Black spot, White spot
7	Pressure Roller	78.5 mm	Contamination on reverse side of paper

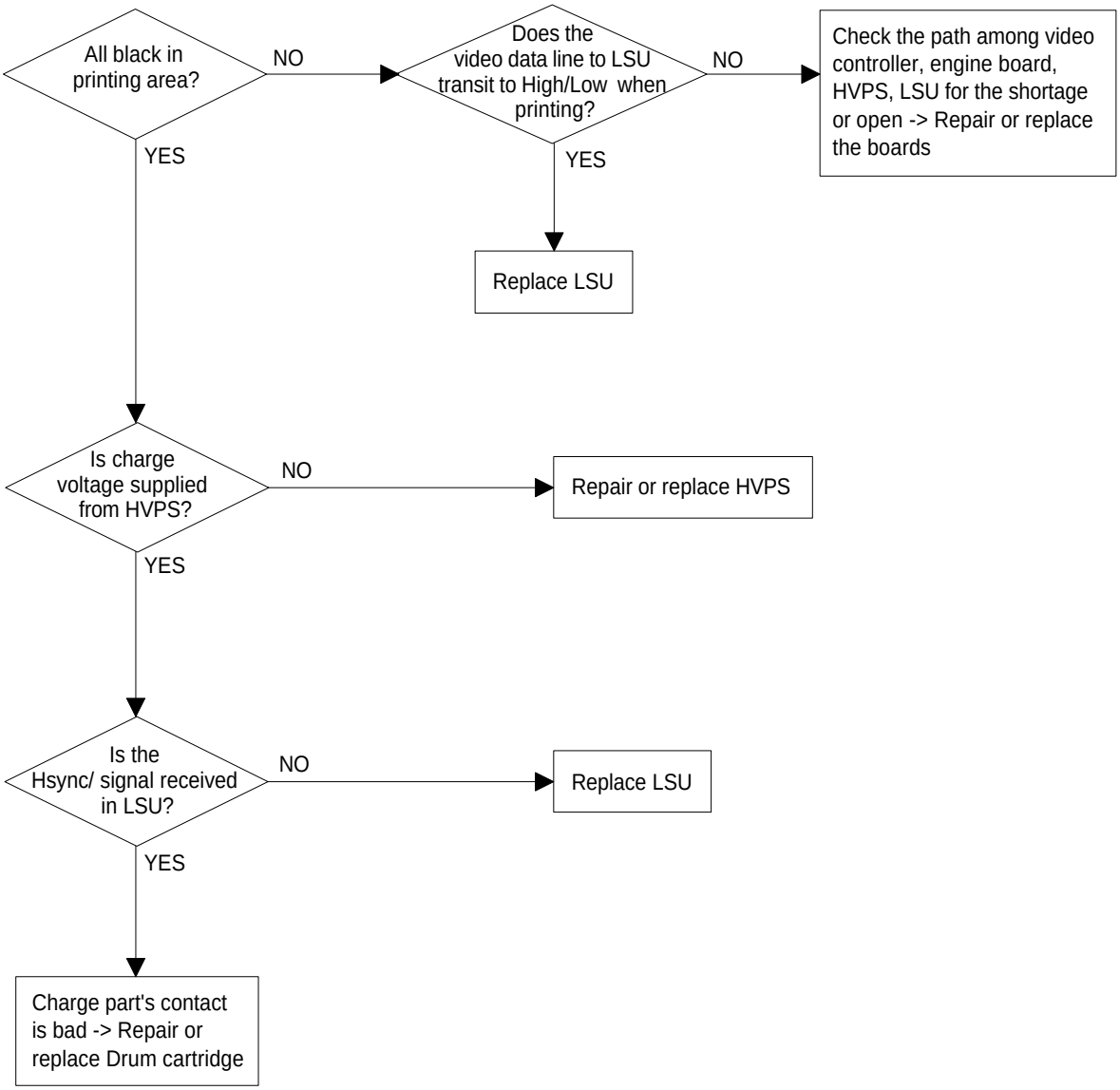
No Image


No image?
NO
A on next page
YES
Self test pattern prints?
NO
Self testing is possible ?
NO
Retest after replacing the connector or controller board
YES
YES
Check connection to computer or replace controller
Take out the cartridge and prepare the tester for electronic connection
Is the OPC terminal of machine is well-connected to Frame?
NO
Repair or replace the GND terminal
YES
Does the video data line to LSU transit to High/Low when printing?
NO
Check the path between Main board and HVPS. Repair or replace the defective component or board
YES
The mirror in LSU might be misplaced so the light path to the OPC deviates ->Repair or replace LSU or remove any defective matters in the machine

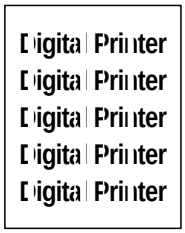

A
Transfer voltage OK? (on the transfer roller shaft)
NO
YES
Are the connection terminal and connection correct?
NO
Repair or replace terminal
YES
Replace HVPS or repair defective component
Developing (-440V) and supplying (-590V) voltage are OK?
NO
Is the connection terminal OK?
NO
Repair or replace terminal
YES
Replace HVPS or repair defective component
YES
Does the counter indicate over the toner's guaranty life
NO
Transfer roller might be out of its location
-> Locate the roller into its place
This could occurs when he power of LSU is low or the density is low due to the obstacles on the window
-> Replace LSU or clean the window
YES
Replace the toner cartridge

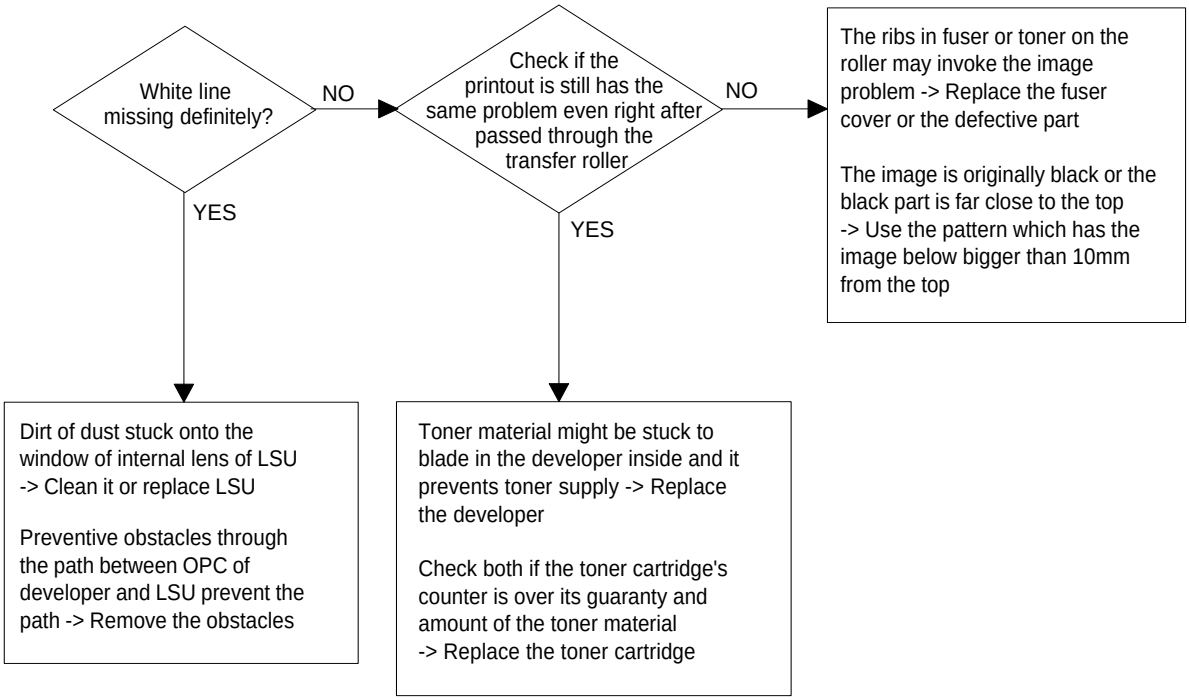
All Black




All black in printing area?
NO
Does the video data line to LSU transit to High/Low when printing?
NO
Check the path among video controller, engine board, HVPS, LSU for the shortage or open -> Repair or replace the boards
YES
YES
Replace LSU
Is charge voltage supplied from HVPS?
NO
Repair or replace HVPS
YES
Is the Hsync/ signal received in LSU?
NO
Replace LSU
YES
Charge part's contact is bad -> Repair or replace Drum cartridge

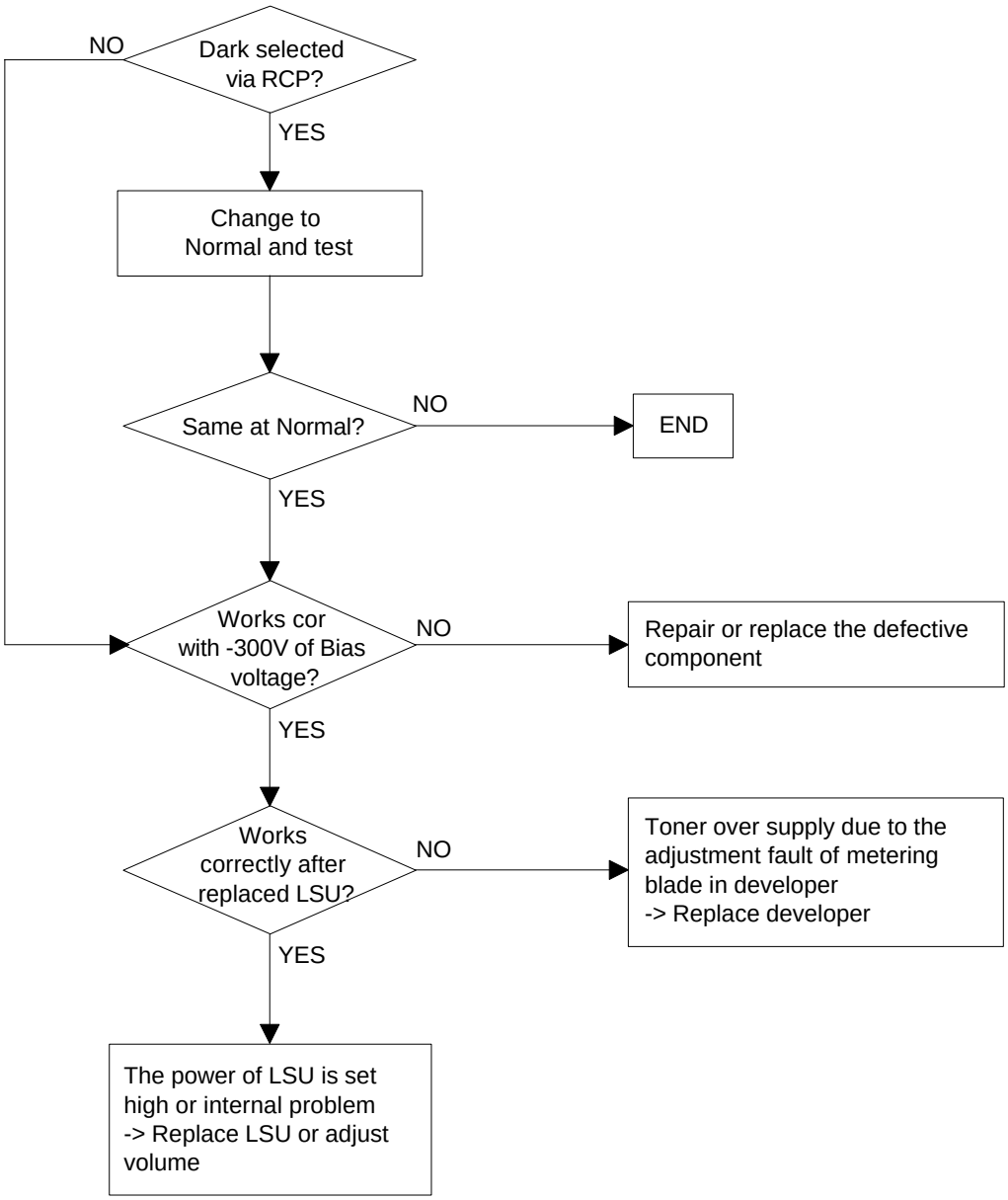
Vertical White Line (Band)




White line missing definitely?
NO
YES
Check if the printout is still has the same problem even right after passed through the transfer roller
NO
YES
The ribs in fuser or toner on the roller may invoke the image problem -> Replace the fuser cover or the defective part
The image is originally black or the black part is far close to the top -> Use the pattern which has the image below bigger than 10mm from the top
Dirt of dust stuck onto the window of internal lens of LSU -> Clean it or replace LSU
Preventive obstacles through the path between OPC of developer and LSU prevent the path -> Remove the obstacles
Toner material might be stuck to blade in the developer inside and it prevents toner supply -> Replace the developer
Check both if the toner cartridge's counter is over its guaranty and amount of the toner material -> Replace the toner cartridge

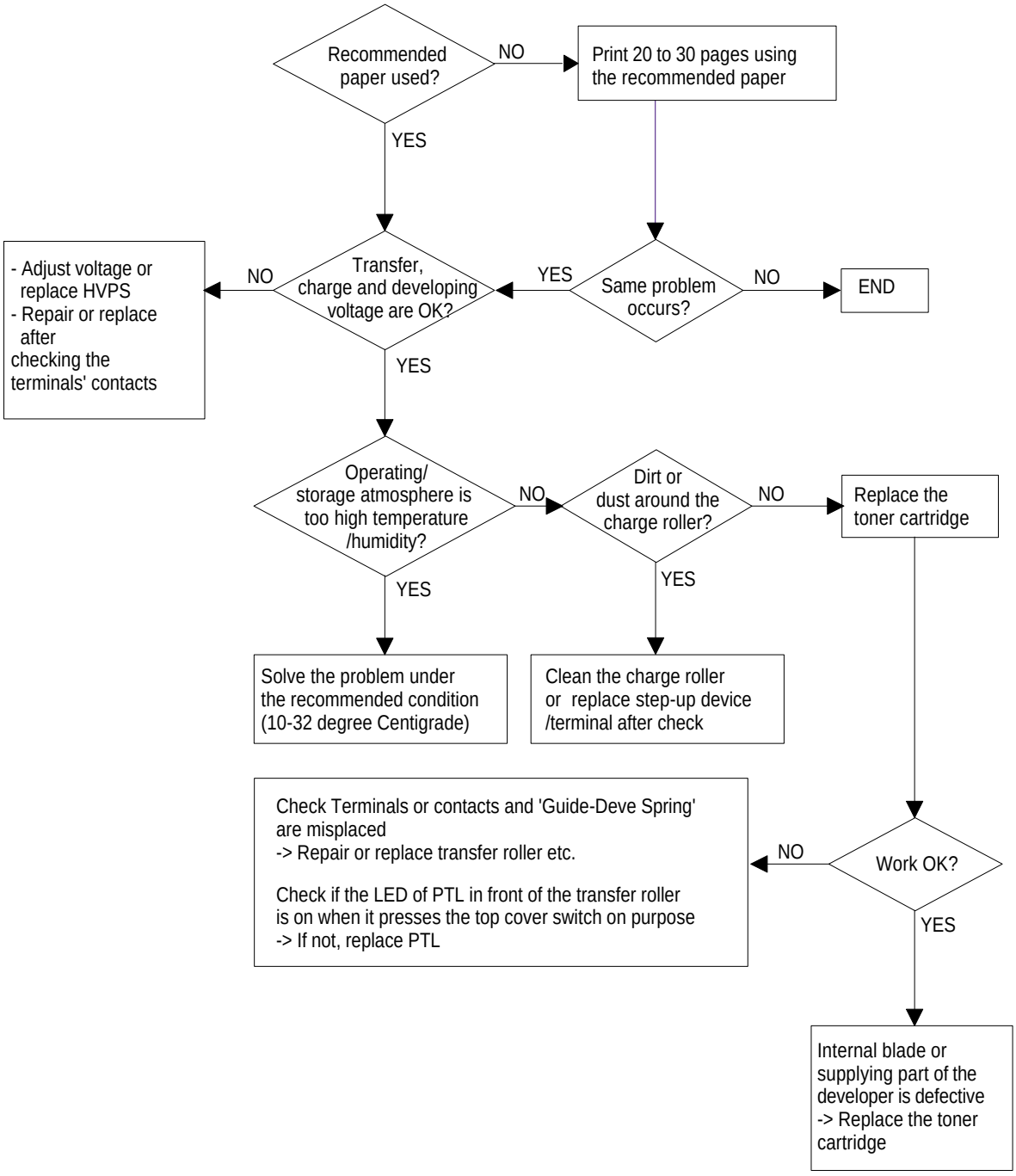
Dark Image

[redacted]



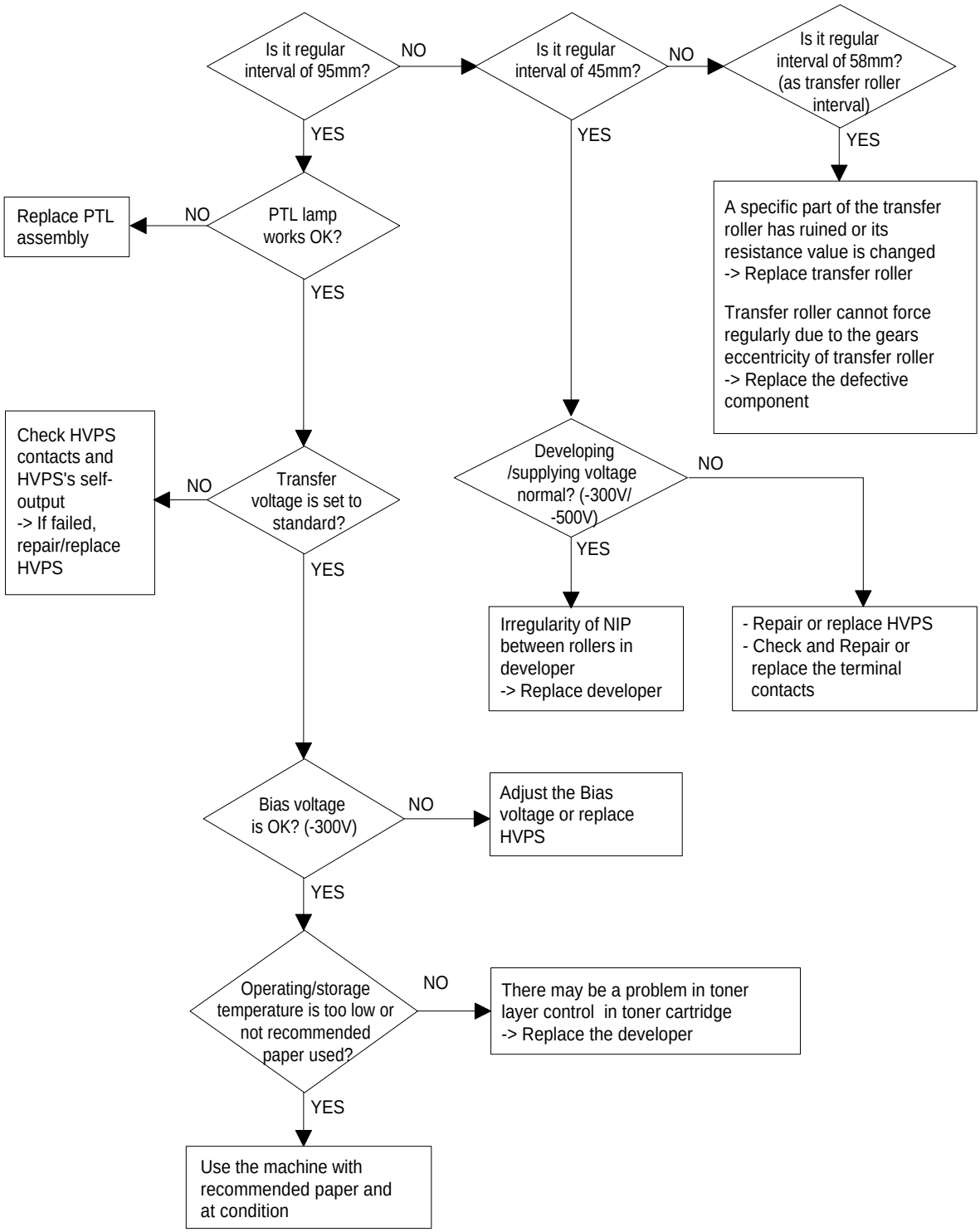
Background

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer


Recommended paper used?
NO
Print 20 to 30 pages using the recommended paper
YES
Same problem occurs?
NO
END
YES
Transfer, charge and developing voltage are OK?
NO
- Adjust voltage or replace HVPS
- Repair or replace after checking the terminals' contacts
YES
Operating/ storage atmosphere is too high temperature /humidity?
NO
Dirt or dust around the charge roller?
NO
Replace the toner cartridge
YES
Solve the problem under the recommended condition (10-32 degree Centigrade)
YES
Clean the charge roller or replace step-up device /terminal after check
Work OK?
NO
Check Terminals or contacts and 'Guide-Deve Spring' are misplaced
-> Repair or replace transfer roller etc.
Check if the LED of PTL in front of the transfer roller is on when it presses the top cover switch on purpose
-> If not, replace PTL
YES
Internal blade or supplying part of the developer is defective
-> Replace the toner cartridge

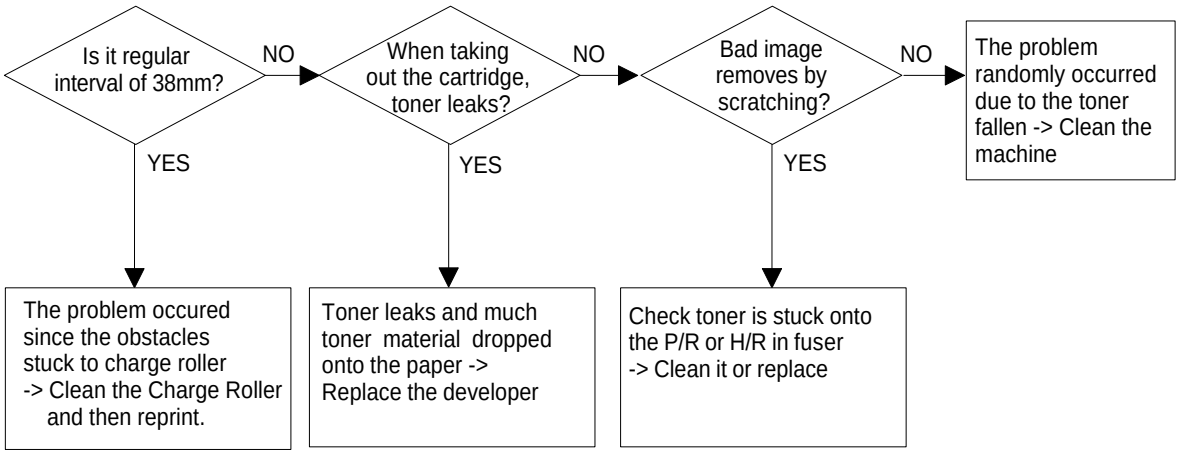
Ghost

Digital Printer
Digital Printer
Digital Printer

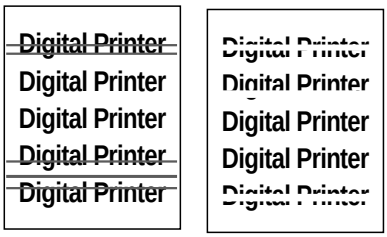

Is it regular interval of 95mm?
NO
Is it regular interval of 45mm?
NO
Is it regular interval of 58mm? (as transfer roller interval)
YES
YES
YES
Replace PTL assembly
NO
PTL lamp works OK?
YES
A specific part of the transfer roller has ruined or its resistance value is changed
-> Replace transfer roller
Transfer roller cannot force regularly due to the gears eccentricity of transfer roller
-> Replace the defective component
Check HVPS contacts and HVPS's self-output
-> If failed, repair/replace HVPS
NO
Transfer voltage is set to standard?
YES
Developing /supplying voltage normal? (-300V/ -500V)
NO
YES
Irregularity of NIP between rollers in developer
-> Replace developer
- Repair or replace HVPS
- Check and Repair or replace the terminal contacts
Bias voltage is OK? (-300V)
NO
Adjust the Bias voltage or replace HVPS
YES
Operating/storage temperature is too low or not recommended paper used?
NO
There may be a problem in toner layer control in toner cartridge
-> Replace the developer
YES
Use the machine with recommended paper and at condition

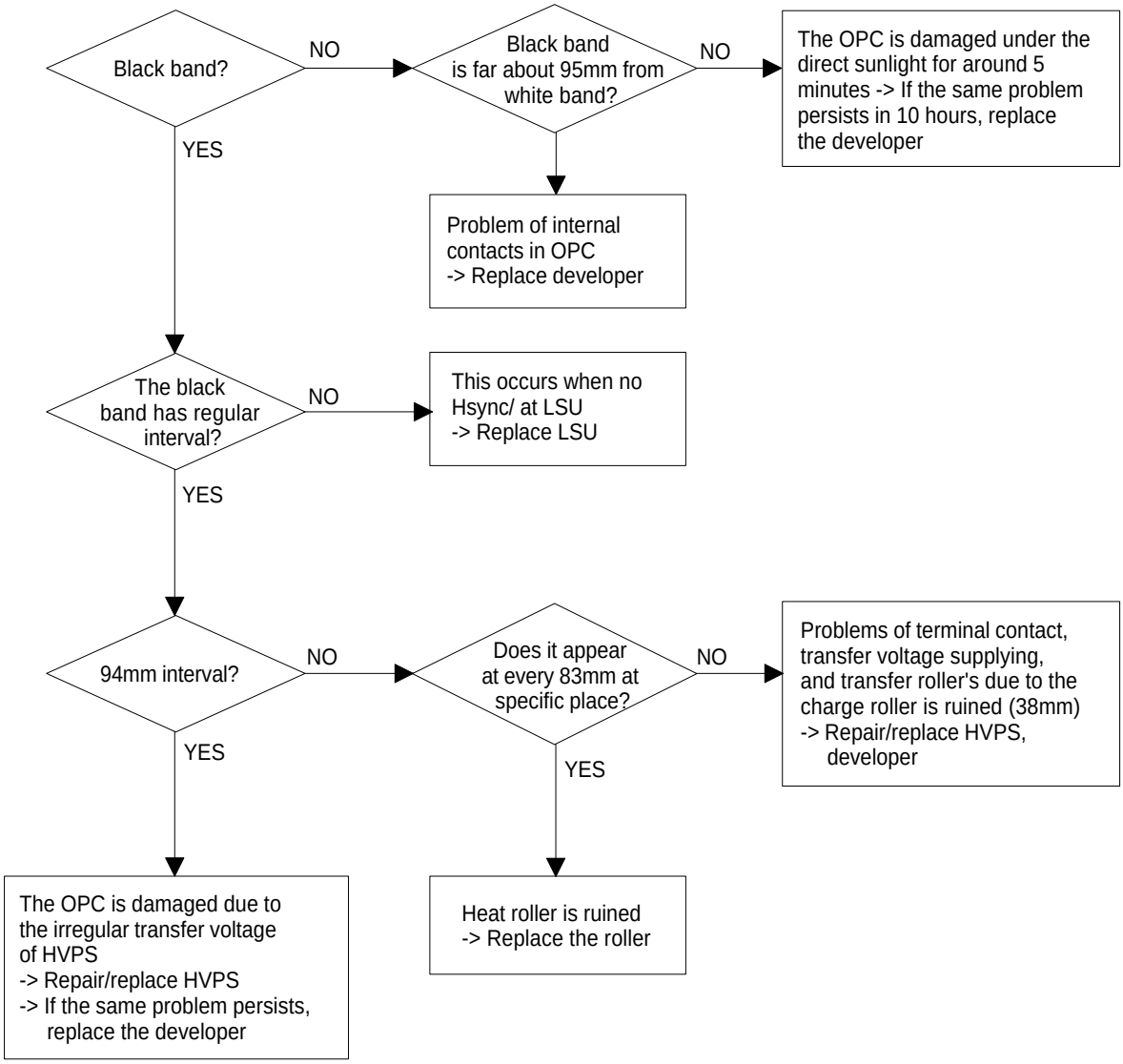
Black Spot

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer


Is it regular interval of 38mm?
NO
When taking out the cartridge, toner leaks?
NO
Bad image removes by scratching?
NO
The problem randomly occurred due to the toner fallen -> Clean the machine
YES
YES
YES
The problem occured since the obstacles stuck to charge roller -> Clean the Charge Roller and then reprint.
Toner leaks and much toner material dropped onto the paper -> Replace the developer
Check toner is stuck onto the P/R or H/R in fuser -> Clean it or replace

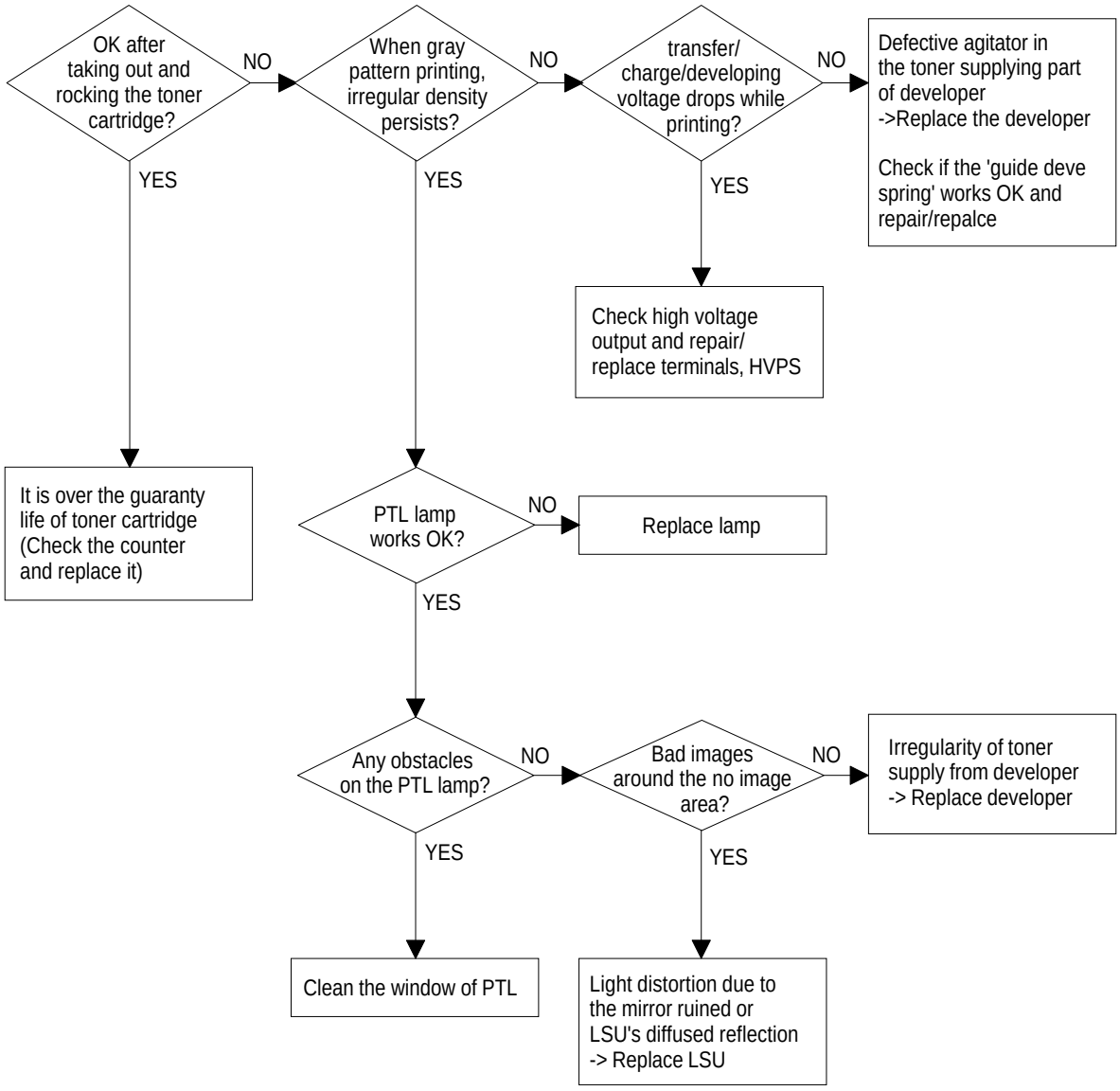
Horizontal Band



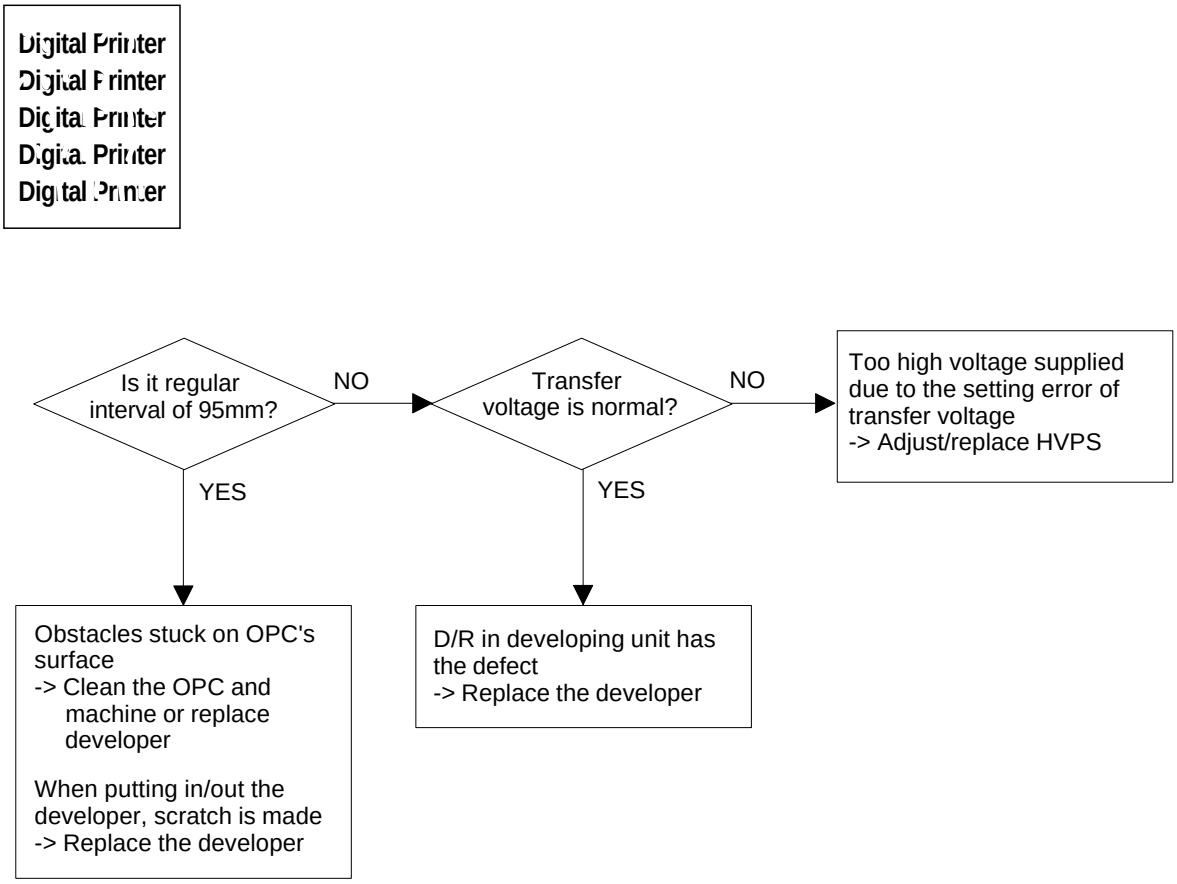

Black band?
NO
Black band is far about 95mm from white band?
NO
The OPC is damaged under the direct sunlight for around 5 minutes -> If the same problem persists in 10 hours, replace the developer
YES
Problem of internal contacts in OPC -> Replace developer
The black band has regular interval?
NO
This occurs when no Hsync/ at LSU -> Replace LSU
YES
94mm interval?
NO
Does it appear at every 83mm at specific place?
NO
Problems of terminal contact, transfer voltage supplying, and transfer roller's due to the charge roller is ruined (38mm) -> Repair/replace HVPS, developer
YES
YES
The OPC is damaged due to the irregular transfer voltage of HVPS -> Repair/replace HVPS -> If the same problem persists, replace the developer
Heat roller is ruined -> Replace the roller

Irregular Density

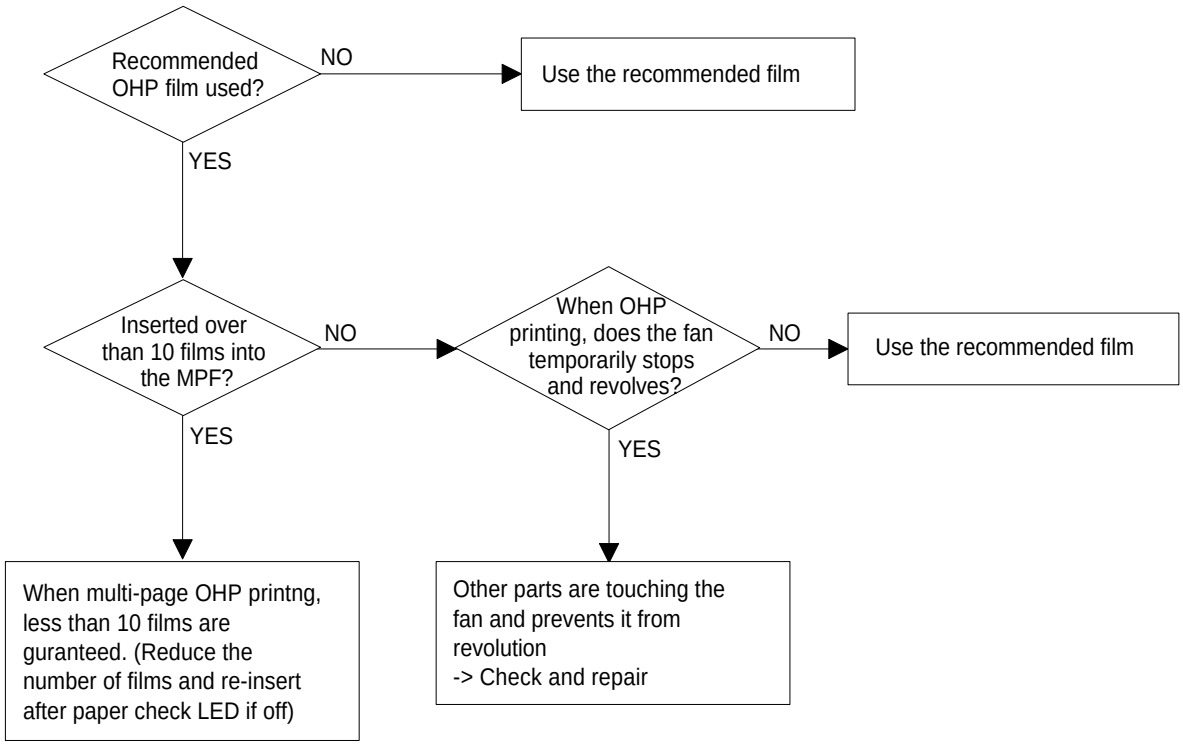
Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer


OK after taking out and rocking the toner cartridge?
NO
When gray pattern printing, irregular density persists?
NO
transfer/ charge/developing voltage drops while printing?
NO
Defective agitator in the toner supplying part of developer
->Replace the developer
Check if the 'guide deve spring' works OK and repair/repalce
YES
YES
YES
Check high voltage output and repair/ replace terminals, HVPS
It is over the guaranty life of toner cartridge (Check the counter and replace it)
PTL lamp works OK?
NO
Replace lamp
YES
Any obstacles on the PTL lamp?
NO
Bad images around the no image area?
NO
Irregularity of toner supply from developer
-> Replace developer
YES
YES
Clean the window of PTL
Light distortion due to the mirror ruined or LSU's diffused reflection
-> Replace LSU

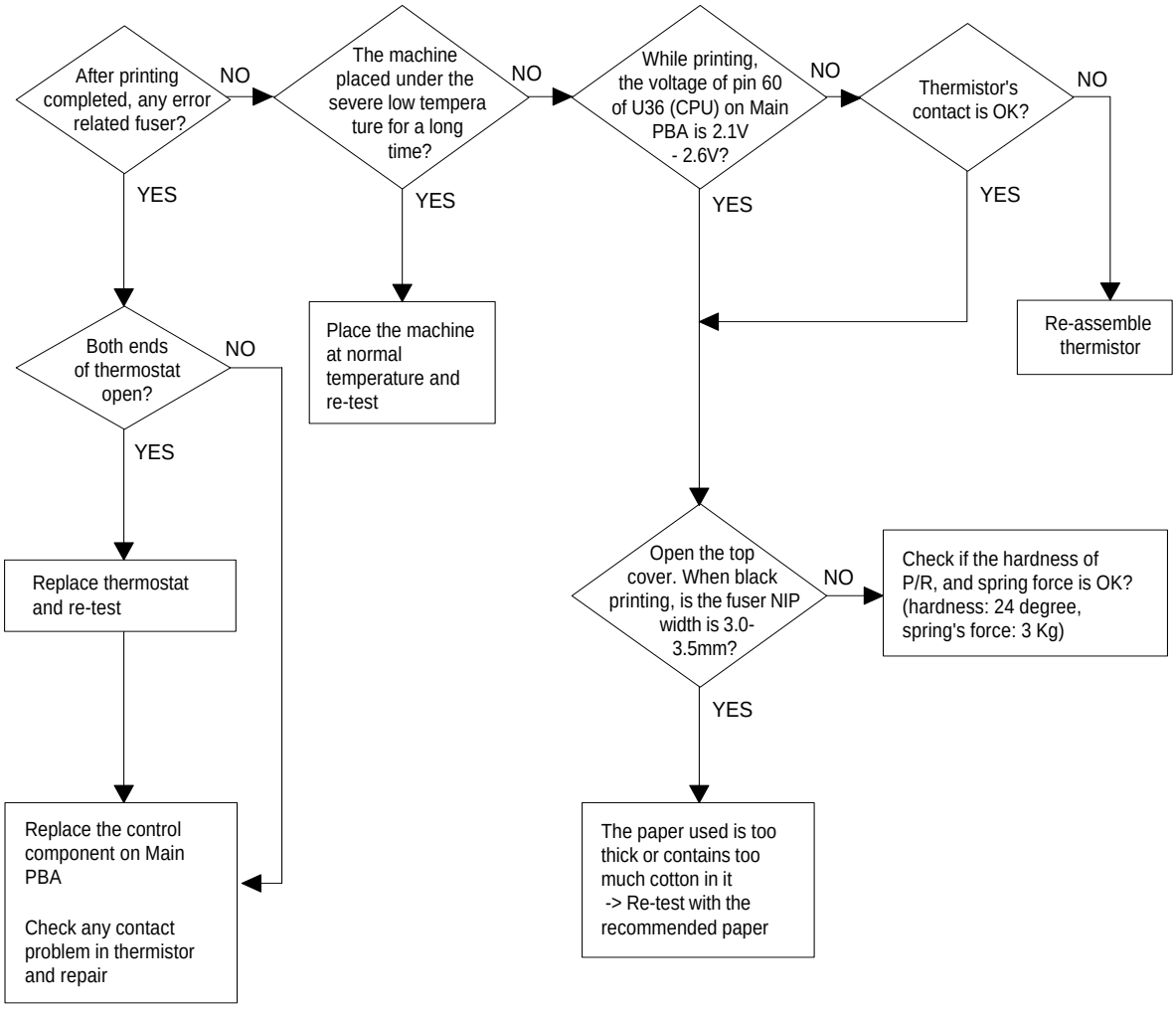
White Spot


Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer
Is it regular interval of 95mm?
NO
Transfer voltage is normal?
NO
Too high voltage supplied due to the setting error of transfer voltage
-> Adjust/replace HVPS
YES
YES
Obstacles stuck on OPC's surface
-> Clean the OPC and machine or replace developer
When putting in/out the developer, scratch is made
-> Replace the developer
D/R in developing unit has the defect
-> Replace the developer

Trembling at the End When OHP Printing


Recommended OHP film used?
NO
Use the recommended film
YES
Inserted over than 10 films into the MPF?
NO
When OHP printing, does the fan temporarily stops and revolves?
NO
Use the recommended film
YES
YES
When multi-page OHP printng, less than 10 films are guranteed. (Reduce the number of films and re-insert after paper check LED if off)
Other parts are touching the fan and prevents it from revolution
-> Check and repair

Poor Fusing Grade

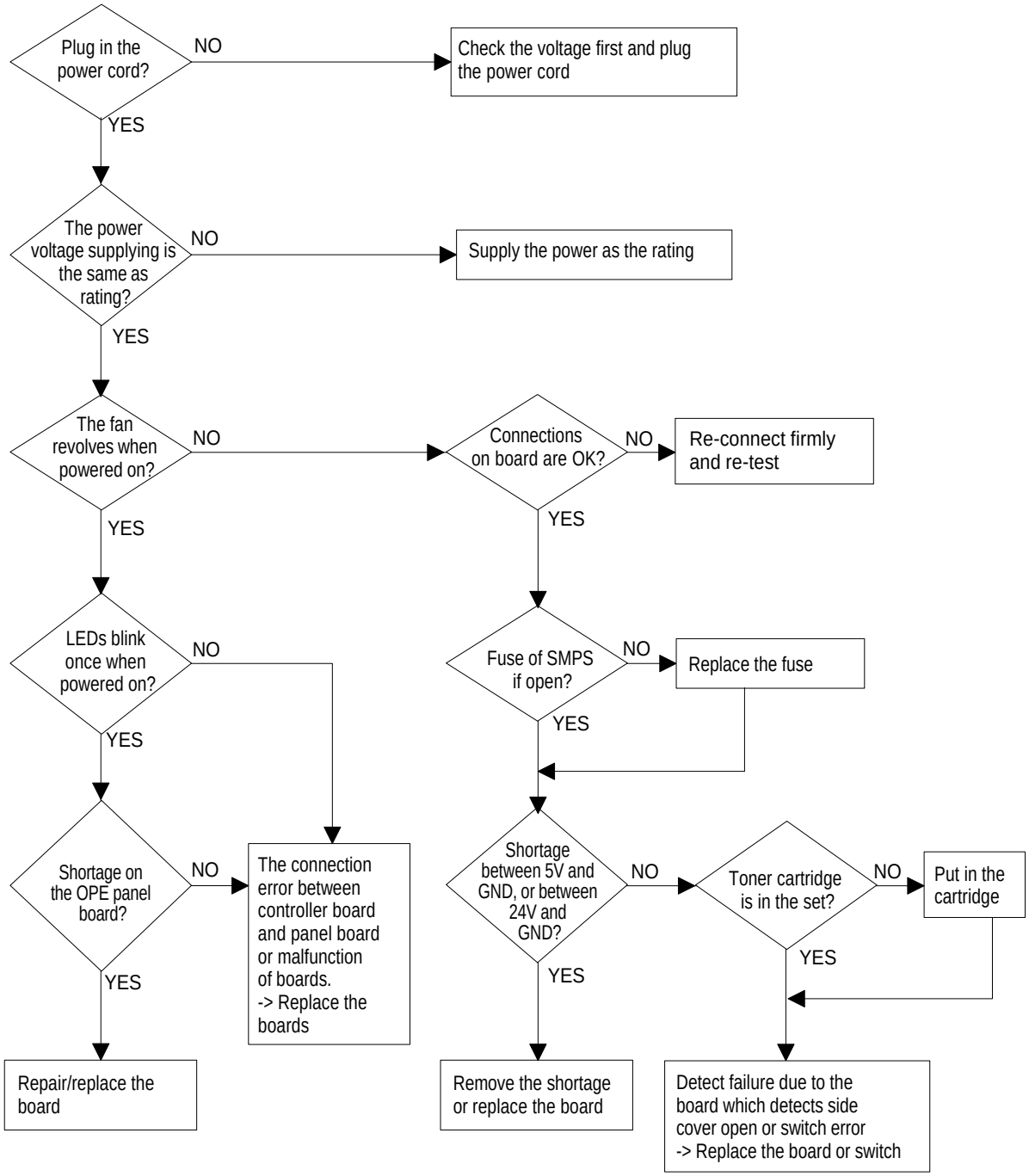

After printing completed, any error related fuser?
NO
YES
The machine placed under the severe low tempera ture for a long time?
NO
YES
While printing, the voltage of pin 60 of U36 (CPU) on Main PBA is 2.1V - 2.6V?
NO
YES
Thermistor's contact is OK?
NO
YES
Re-assemble thermistor
Place the machine at normal temperature and re-test
Both ends of thermostat open?
NO
YES
Replace thermostat and re-test
Replace the control component on Main PBA
Check any contact problem in thermistor and repair
Open the top cover. When black printing, is the fuser NIP width is 3.0-3.5mm?
NO
YES
Check if the hardness of P/R, and spring force is OK? (hardness: 24 degree, spring's force: 3 Kg)
The paper used is too thick or contains too much cotton in it
-> Re-test with the recommended paper

4-6-4 Malfunction

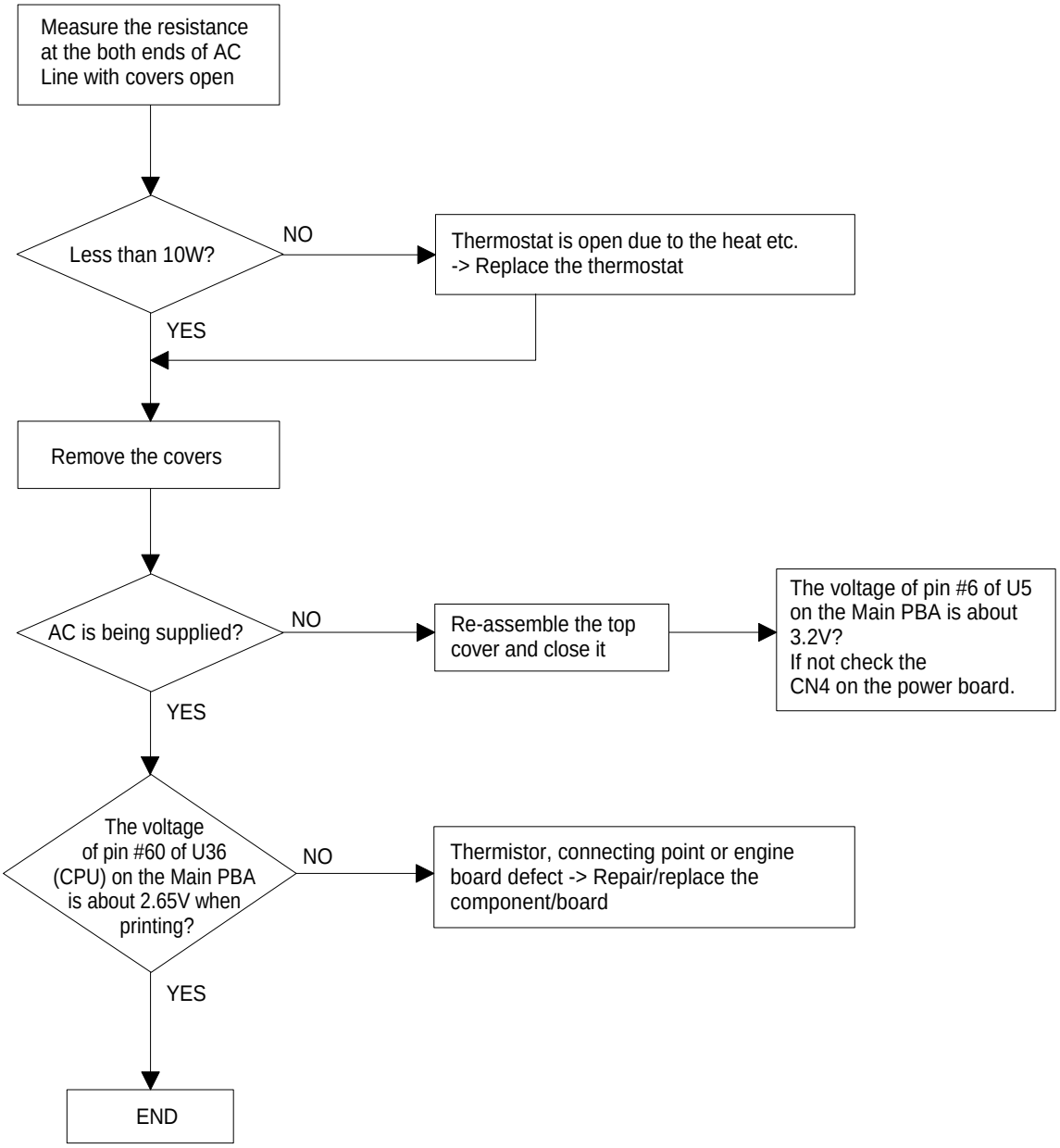
Error Status	Check	Solution
No power	1. Check power is supplying 2. Check fuse F1 open	1. If supplying power differs from machine's power rating, replace the machine. 2. Replace it.
Fuser Error	1. Thermostat open 2. AC wire open 3. Thermistor wire open 4. Main PBA	1. Detach AC connector and measure the resistane between pin 1 and 2. If it is megohm, thermostat is open, Replace it. 2. Check bad connector contact or wire is cut. 3. Check thermistor wire and its connection. 4. Replace Main PBA
Cover open	1. When close Side cover, check the lever is pressed 2. Micro switch's contact 3. CPU and related circuit	1. Open Side cover and press the lever with pen. If Controller detects cover close, there is some mechanical trouble in Side cover and lever's assembly. If not so there is electrical problem.
Jam 0	Check where Jam 0 happens 1. Paper is not picked up 2. Paper is located in feed sensor 3. Happened when inserting specific papers such as envelope into the MPF (Multipurpose Paper Feeder)? 4. Happened when inserting specific papers such as envelope into the Manual Feeder? 5. Is the Stacker Extender is folded out? 6. Does not the Guide Adjust distort the papers	1. Check whether solenoid is working or not by using Engine test mode 2. Check feed sensor malfunction. 3. Re-try inserting a fewer papers. •fan the papers and align •take out the loaded papers and insert them reverse direction 4. Take out the loaded papers and insert them reverse direction •inserted papers as recommended for Manual Feeding? •When loading, tap the papers until paper detect sensor senses loading 5. When using long papers, use the Stacker Extender 6. Adjust Guide to fit the paper width
Jam 1	Paper is stopped in just after of fuser unit.	1. It is mostly resulted from double feeding. Check paper is well stocked in feeder. 2. Check feed actuator position and actuator's operating. There may be stiff movind or double reflection. If not so, check the operation of feed sensor by Engine test mode. 3. Check exit lever operation. Remore jam and check actuator moving by hand. If actuator is too stiff, paper is wrapped around the heat roller. Remove obstacles or replace.
Jam 2	Check where Jam 2 happens 1. Paper is curled and cannot exit. 2. Paper is curled in the exit cover?.	1. Remove paper using pinset or some tool and watch if separate claws have any troble. Clean around fuser. 2. Check locking works wells. Watch whether the ribs of exit cover hace any burr or resisitive edge. If they do, remove obstacles or replace.

Error Status	Check	Solution
Jam 2 at face-down tray	1. Then paper is not drawn in because of the stack of papers in the Out tray. 2. Does it curl while coming out?	1. Load recommended quantity of papers 2. Open the Cover Front and check whether roller or spring, which are related to paper out, is not out of position. If so, re-locate or replace.
Clutch error	1. Check the spring of solenoid 2. Check the armature assembly/cushion 3. Electrical check	1. Check whether the spring is expanded or not. 2. Check armature is well installed. It may be unstable assemble. 3. Remove the Main PBA.
High voltage error	1. Check the terminal output voltage 2. Check HVPS	1. Remove the Toner cartridge and open the cover and press cover open switch lever and measure the voltage with high voltage probe and sending printing data. If the voltage is normal, change the toner cartridge. 2. Disassemble the left side cover, and check HV of the solder side of HVPS and change it.
Feeding obstacles	Does the Plate-knockup prevent the paper loading?	MPF : Turn the power off and on. Open and close the Side cover to return to the original state. Cassette : Adjust Guide to fit the paper width.
Skew	Is the Guide adjust set to the paper width?	Fit the paper width using the Guide adjust.
Stacking	1. Took out the Stacker extender to support long papers? 2. Stacked too many papers more than Stacker can hold?	1. Use extender as per the paper length. 2. The Face-up stacker normally can hold 100 pages when using 75g/m2, however, stacking capacity can be lowered depending on the type of papers.
Engine Error	Check CBF Harness_CN7. (Main PBA to LSU)	Refer to troubleshooring “ENGINE ERROR”.
Document Jam	Document is not picked up(in ADF).	1. Check document is well stocked in ADF. 2. Check whether document was been fastened together by staple or clip. 3. Load recommended quantity of papers.
	Document is stopped after it has fed into the ADF.	1. Check whether the Reg. sensor is working or not. 2. Check whether the Feed Roller is working or not.
	Does it curl while coming out?	1. Check the Open Cover whether there are bosses. 2. Check the ADF ass'y is well assemble.

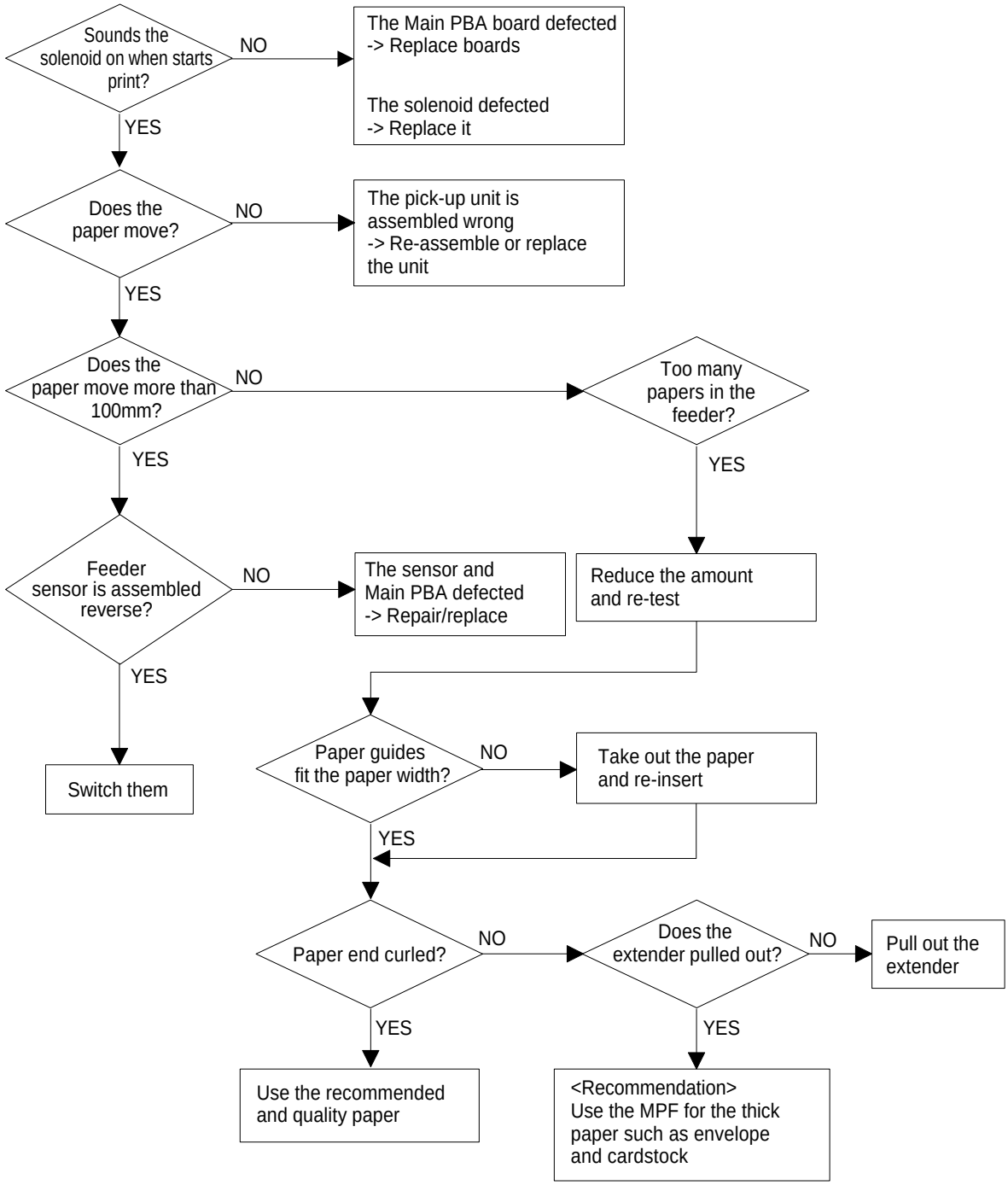
No Power (LCD NO display LED Off)



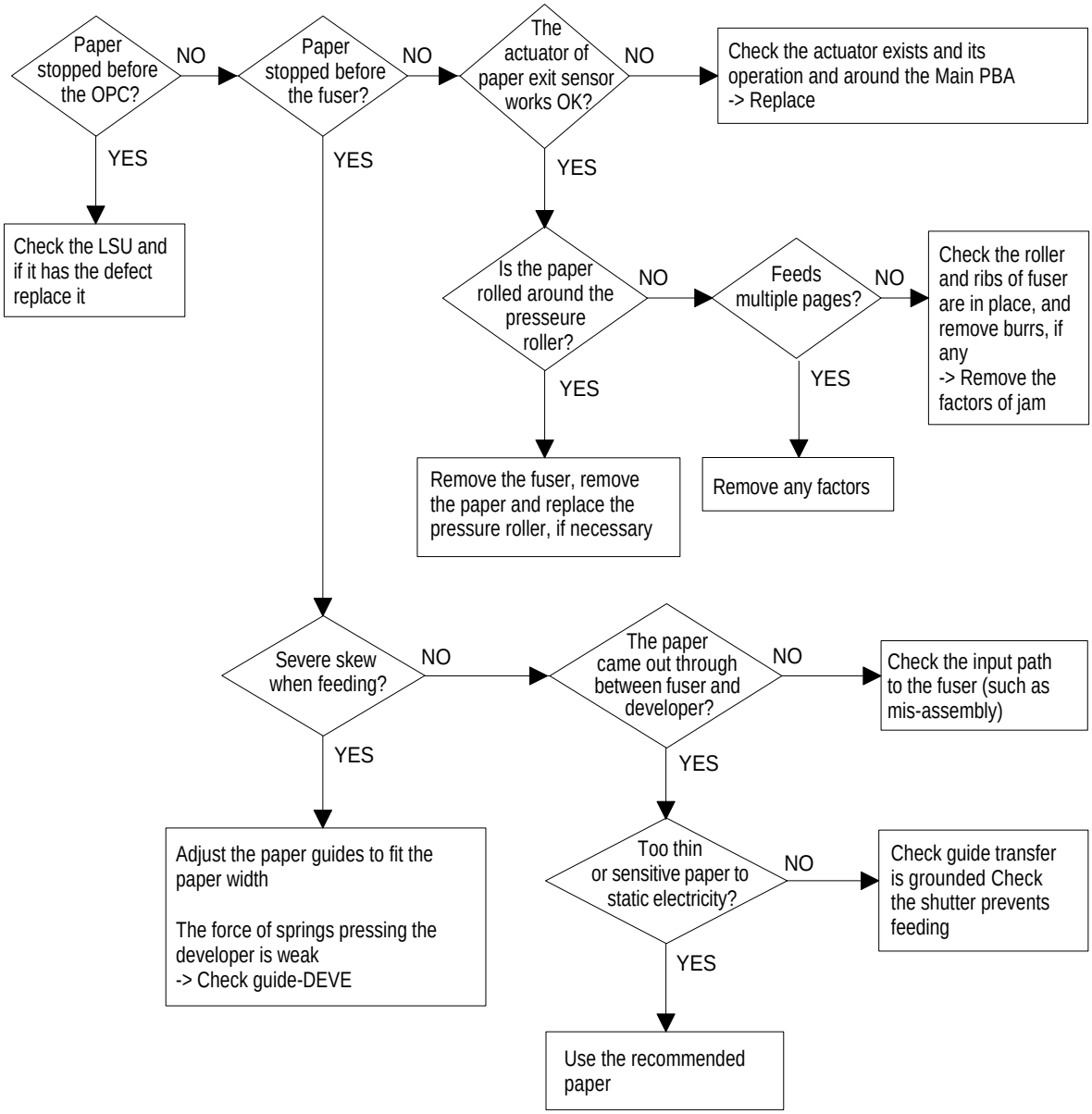
Fuser Error


Measure the resistance at the both ends of AC Line with covers open
Less than 10W?
NO
Thermostat is open due to the heat etc. -> Replace the thermostat
YES
Remove the covers
AC is being supplied?
NO
Re-assemble the top cover and close it
The voltage of pin #6 of U5 on the Main PBA is about 3.2V? If not check the CN4 on the power board.
YES
The voltage of pin #60 of U36 (CPU) on the Main PBA is about 2.65V when printing?
NO
Thermistor, connecting point or engine board defect -> Repair/replace the component/board
YES
END

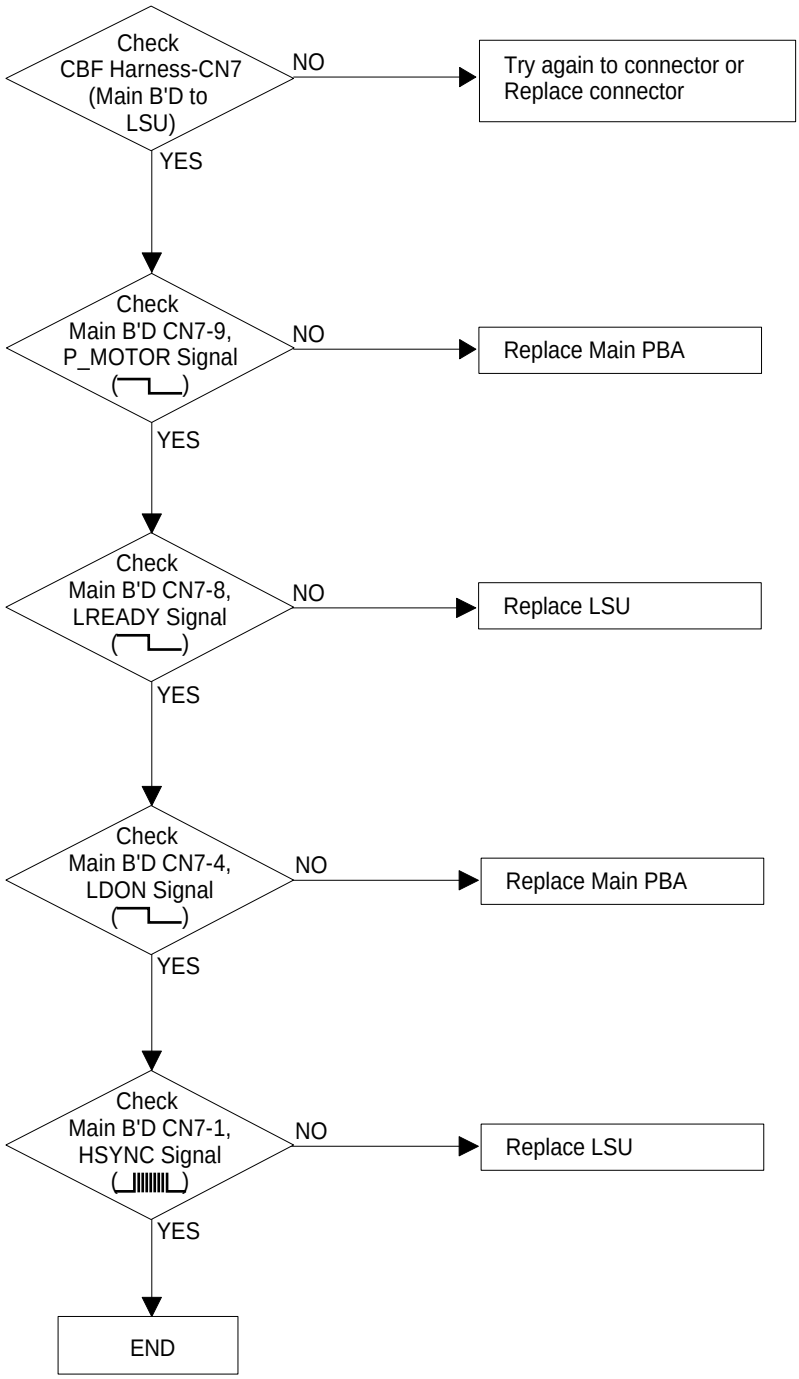
Paper Jam (Mis-Feeding)



Paper Jam(Jam 1)


Paper stopped before the OPC?
NO
Paper stopped before the fuser?
NO
The actuator of paper exit sensor works OK?
NO
Check the actuator exists and its operation and around the Main PBA
-> Replace
YES
YES
YES
Check the LSU and if it has the defect replace it
Is the paper rolled around the presseure roller?
NO
Feeds multiple pages?
NO
Check the roller and ribs of fuser are in place, and remove burrs, if any
-> Remove the factors of jam
YES
YES
Remove the fuser, remove the paper and replace the pressure roller, if necessary
Remove any factors
Severe skew when feeding?
NO
The paper came out through between fuser and developer?
NO
Check the input path to the fuser (such as mis-assembly)
YES
YES
Adjust the paper guides to fit the paper width
The force of springs pressing the developer is weak
-> Check guide-DEVE
Too thin or sensitive paper to static electricity?
NO
Check guide transfer is grounded Check the shutter prevents feeding
YES
Use the recommended paper

Engine Error



4-6-5 Toner Cartridge and Drum Cartridge Service

It is not guaranteed for the default caused by using other toner and Drum Cartridge cartridge other than the cartridge supplied by the Samsung Electronic or caused by non-licensed refill production.

Precautions on Safe-keeping of the Drum Cartridge

Excessive exposure to direct light more than a few minutes may cause damage to the cartridge.

Service for the Life of Toner Cartridge

If the printed image is light due to the life of the toner, you can temporarily improve the print quality by redistributing the toner(Shake the toner cartridge), however, you should replace the toner cartridge to solve the problem thoroughly.

Service for Judgement of Inferior Expendables and the Standard of Guarantee

Please refer to User's Manual or Instructions on Fax/Printer Expendables SVC for the judgement of inferior expendables and the standard of guarantee besides this service manual.

4-6-5-1 Signs and Measures at Poor toner cartridge

Fault	Signs	Cause & Check	Solution
Light image and partially blank image (The life is ended.) Digital Printer Digital Printer Digital Printer Digital Printer Digital Printer	• The printed image is light or unclean and untidy. • Some part of the image is not printed. • Periodically a noise as "tick tick" occurs.	1. If the image is light or unclean and untidy printed image - Shake the developer and then recheck. (1)NG: Check the weight of the developer (2)OK: Lack of toner, so the life is nearly closed. 2. Some part of image is not printed - Shake the developer and then recheck. (1)NG: Check the weight of the developer and clean the LSU window with a cotton swab, then recheck. (2)OK: Lack of toner, so the life is nearly closed. 3. Periodically a noise as "tick tick" occurs - Measure the cycle and the weight of the developer. 4. White vertical stripes on the whole screen or partly : Check the weight of the developer.	1. All of 1, 2, 3 above- If it become better by shaking, replace with a new developer after 50-100 sheets in the closing state of the life span. 2. In case of 2- If it becomes better after cleaning the LSU window, then the developer is normal. (Because of foreign substance on the LSU window, the image has not been printed partly.) 3. In case of 3- If the cycle of noise is about 2 seconds, the toner inside the developer has been nearly exhausted.(Purchase and replace with a new developer after using about 200 sheets at the point of occurrence) 4. In case of 3- This is a phenomenon caused by lack of toner, so replace with a new developer.
Toner Contamination	• Toner is fallen on the papers periodically. • Contaminated with toner on prints partly or over the whole surface.	1. Toner is fallen on the paper periodically. (1)Check the cycle of the falling of the toner. (2)Check the appearance of both ends of the developer OPC drum. 2.The center of the printed matter is contaminated with toner. (1)Check whether foreign substances or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. If both ends of the OPC drum are contaminated with toner: Check the life of the developer. 2. Check whether it could be recycled.

Fault	Signs	Cause & Check	Solution
White Black spot 	• Light or dark black dots on the image occur periodically. • White spots occur in the image periodically.	1. If light or dark periodical black dots occur, this is because the developer rollers are contaminated with foreign substance or paper particles. (1)37.7mm interval : Charged roller (2)94.3mm interval : OPC cycle 2. If white spots occur in a black image at intervals of 94.3 mm, or black spots occur elsewhere, the OPC drum is damaged or foreign substance is stuck to the surface. 3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has been expired or the transfer voltage is abnormal.	1. In case of 1 above - Run OPC Cleaning Mode Print 4-5 times repeatedly to remove. Especially check foreign substance on the OPC surface, then remove them with a clean gauze moistened with IPA(Isopropyl Alcohol) not to damage OPC if necessary. Caution : Never use usual alcohol. 2. In case of 2 If they are not disappeared by running OPC Cleaning Mode Print 4-5 times. : at intervals of 94.3mm - Replace the OPC Drum. : at intervals of 37.7mm - Remove foreign substance, Clean the Charged Roller : Broken image - Replace the developer according to carelessness. 3. In case of 3 - Exchange the transfer roller because the life of the transfer roller in use has been expired. (Check the transfer voltage and readjust if different.)
Recycled product	• Poor appearance of the developer. • Unclean and rough printouts. • Bad background in the image.	1. Poor appearance of the developer. (1)Check the damage to label and whether different materials are used. (2)Check the appearance of parts of the developer, such as frame, hopper. 2. Unclean and rough printouts. (1)Check whether foreign substance or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. In case of 1 - (1)If there is an evidence of disassembling the developer. (2)If materials other than normal parts of the developer are added or substituted. 2. In case of 2 - If there are any abnormals in connection with the situation of 1. (1)It occurs when the developer is recycled over 2 times. (2)If toner nearly being expired are collected to use, it is judged as the recycled developer.

Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	• The printed image is too light or dark, or partially contaminated black. • Totally contaminatedblack. (Black image printed out)	1. The printed image is too light or dark, or partially contaminated black. (1)Check whether foreign sub stance or toner are stuck to the terminal(point of contact) of the developer. (2)Check whether the terminal assembly is normal. 2. Totally contaminated black. (Black image printed out) (1)Check whether foreign sub stances are stuck to the terminal(point of contact) of the developer and the state of assembly. (Especially check the charged roller terminal.)	1. All of 1, 2, 3 above (1)Remove toner and foreign substances adhered to the contact point of the developer. (2)The contact point of the unit facing that of the developer also must be cleaned. (3)If the terminal assembly is unsafe: • Fully stick the terminal to or reassemble it after disassembling. • Disassemble the side plate and push the terminal to be stuck, then reassemble it. 2. In case of 2 It is a phenomenon when the OPC drum of the developer is not electrically charged. Clean the terminals of the charged roller, then recheck it.

4-6-6 The cause and solutions of bad environment of the software

4-6-6-1 The printer is not working (1)

• **Description :** While Power turned on, the printer is not working in the printing mode.

Check and Cause	Solution
1. Check if the PC and the printer is properly connected and the toner cartridge installed.	1. Replace the printer cable. If the problems not solved even after the cable replaced, check the amount of the remaining tone.
2. Printing is nor working in the Windows.	2. Check if the connection between PC and printer port is proper. If you use windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check in which program the printing is not working. The best way to find out is to open the memo pad to check the function of printing. If it is not working in a certain program, adjust the setup the program requires. Sometimes, the printout is normal within the Windows basic programs, but it's not working in a particular program. In such case, install the new driver again. If not working in the Windows basic program, Check the setup of the port of CMOS is on ECP. And check the address of IRQ 7 and 378
3. Check if the printer cable is directly connected to peripheral devices	3. If the scanner needs to be connected to the printer, first the remove the scanner from the PC to see if the printer is properly working alone.

4-6-6-2 The printer is not working (2)

• **Description :** After receiving the printing order, no response at all or the low speed of printing occurs due to wrong setup of the environment rather than malfunction of the printer itself.

Check and Cause	Solution
1. Secure more space of the hard disk.	1. Not working with the message 'insufficient printer memory' means hard disk space problem rather than the RAM problem. In this case, provide more space for the hard disk. Secure more space using the disk utilities program.
2. Printing error occurs even if there is enough space in the hard disk.	2. The connection of the cable and printer port is not proper. Check if the connection is properly done and if the parallel port in CMOS is rightly set up.
3. Check the parallel-port-related items in the CMOS Setup.	3. As a printer port, Select ECP or SPP among SPP(Normal), ECP, and EPP modes(increase printing speed) SPP normal mode support 8-bit data transfer, while ECP Mode transfer the 12-bit data.
4. Reboot the system to print.	4. If the regular font is not printing, the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one.

4-6-6-3 Abnormal Printing

• **Description :** The printing is not working properly even when the cable has no problem. (even after the cable is replaced) If the printer won't work at all or the strange fonts are repeated, the printer driver may be defective or wrong setup in the CMOS Setup.

Check and Cause	Solution
1. Set up the parallel port in the CMOS SETUP.	1. Select SPP(Normal) or ECP LPT Port the among ECP, EPP or SPP in the CMOS Setup.
2. Printer Driver Error.	2. Check the printer in My Computer.(to see if the printer driver is compatible to the present driver or delete the old driver, if defective and reinstall the new driver)
3. Error message from insufficient memory. (The printing job sometimes stops or due to insufficient virtual memory, but it actually comes from the insufficient space of the hard disk.)	3. Delete the unnecessary files to secure enough space of the hard disk and start printing job again.

4-6-6-4 SPOOL Error

• **Description :** To spool which stands for "simultaneous peripheral operations online" a computer document or task list (or "job") is to read it in and store it, usually on a hard disk or larger storage medium so that it can be printed or otherwise processed at a more convenient time (for example, when a printer is finished printing its current document).

Check and Cause	Solution
1. Insufficient space of the hard disk in the directory assigned for the basic spool.	1. Delete the unnecessary files to provide more space to start printing job.
2. If the previous printing error not solved.	2. If there are some files with the extension name of ****.jnl, Delete them and Reboot the Windows to restart printing job.
3. When expected to collide with other program.	3. Shut down all other programs except the current one, if possible.
4. When an application program or the printer driver is damaged.	4. Delete the printer driver completely and reinstall it.
5. When some files related to OS are damaged or virus infected.	5 After rebooting the computer, check for viruses, restore the damaged files and reinstall the program to do the printing job.
6. Memory is less than suggested one.	6. Add up enough memory to the PC.

How to delete the data in the spool manager.

In the spool manager, the installed drivers and the list of the documents waiting to be printed are shown.
Select the document to be deleted and check the delete menu.
If you intend to delete the current document being printed, the data being transferred to the printer will be put out and then the document is removed. Before choosing the document, the menu is still inactive.
Or put the document out of the list and repeat the routine as in the above or finish the spool manager.

Appendix information

The following list shows different materials by model.
The material codes mentioned in themanual are subject to change without prior notice.
For the latest exact information, see ITSELF SYSTEM. **(http://itself.sec.samsung.co.kr)**

•SCX-5315F/XAA

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02717A
ELA HOU-PLATEN(SEC)	JC96-02748A
ELA HOU-OPE(SEC)	JC96-02749A
PMO-COVER OPE(C)	JC72-00796A
WINDOW-LCD(4IN1)	JC64-00071A
PMO-COVER DUMMY OPE(M)	JC72-00858A
PCT-ONETOUCH PAPER	JC72-00872A
PBA SUB-LIU	JC92-01355A

•SCX-5315F/XEG

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02717B
ELA HOU-PLATEN(GER)	JC96-02748D
ELA HOU-OPE(GER)	JC96-02749D
PMO-COVER OPE	JC72-00796C
WINDOW-LCD(GER 4IN1)	JC64-00071C
PMO-COVER DUMMY OPE(M)	JC72-00858C
PCT-ONETOUCH PAPER	JC72-00872C
PBA SUB-LIU	JC92-01355E

•SCX-5315F/XEU

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02717A
ELA HOU-PLATEN(SEC)	JC96-02748A
ELA HOU-OPE(SEC)	JC96-02749A
PMO-COVER OPE(C)	JC72-00796A
WINDOW-LCD(4IN1)	JC64-00071A
PMO-COVER DUMMY OPE(M)	JC72-00858A
PCT-ONETOUCH PAPER	JC72-00872A
PBA SUB-LIU	JC92-01355G

•SCX-5315F/XIL

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02717C
ELA HOU-PLATEN	JC96-02748B
ELA HOU-OPE	JC96-02749B
PMO-COVER OPE	JC72-00796G
WINDOW-LCD(4IN1)	JC64-00071E
PMO-COVER DUMMY OPE(M)	JC72-00858E
PCT-ONETOUCH PAPER	JC72-00872E
PBA SUB-LIU	JC92-01355A

•SCX-5115/XAA

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02718A
ELA HOU-PLATEN ASS'Y	JC96-02752A
ELA HOU-OPE COVER(SEC)	JC96-02753A
PMO-OPE COVER	JC72-00944A
PCT-LCD WINDOW(3 IN 1)	JC64-00071B

•SCX-5115/XEU

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02718A
ELA HOU-PLATEN ASS'Y	JC96-02752A
ELA HOU-OPE COVER(SEC)	JC96-02753A
PMO-OPE COVER	JC72-00944A
PCT-LCD WINDOW(3 IN 1)	JC64-00071B

•SCX-5115/XEG

DESCRIPTION	SEC.CODE
ELA HOU-SCANNER	JC96-02718C
ELA HOU-PLATEN ASS'Y	JC96-02752B
ELA HOU-OPE COVER(SEC)	JC96-02753B
PMO-OPE COVER	JC72-00944G
PCT-LCD WINDOW(3 IN 1)	JC64-00071G

5. Exploded View & Parts List

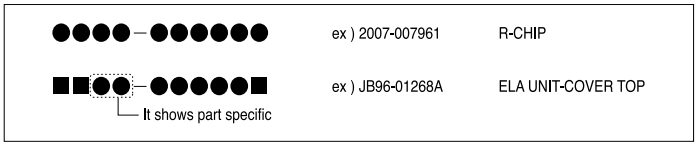
5-1. Main Exploded View & Parts List..... page(5-2)
5-2. Platen Ass'y Exploded View & Parts List..... page(5-5)
5-3. ADF ASS'Y Exploded View & Parts List..... page(5-9)
5-4. Side Cover Ass'y Exploded View & Parts List..... page(5-12)
5-5. Cassette Ass'y Exploded View & Parts List..... page(5-14)
5-6. Exit Ass'y Exploded View & Parts List..... page(5-16)
5-7. Feeder Ass'y Exploded View & Parts List..... page(5-18)
5-8. MP Ass'y Exploded View & Parts List..... page(5-20)
5-9. Base Frame Exploded View & Parts List..... page(5-22)
5-10.Pick-up Ass'y Exploded View & Parts List..... page(5-24)
5-11. Drive Ass'y Exploded View & Parts List..... page(5-26)
5-12. Main Frame Ass'y Exploded View & Parts List..... page(5-28)
5-13. FuserAss'y Exploded View & Parts List..... page(5-30)
5-14. Screw..... page(5-32)

- Deal drawings and service parts are declared for the items with higher rate of inferiority and replaceable in the level of service description only.
- If inferiority occurs, you can replace the parts by the unit declared in deal drawings and service items.

Way to observe Part Code & Description

Part code and Description is quoted and controlled by determined standard. Refer to this determined standard, it will help with ordering Part.

• **There are two kinds of Part code inscription type.**



(● : figure, ■ : character (alphabet))

Type 1 : Controlled by Company : It can be commonly used for all kinds of product SEC produce. Mostly, electronics Parts.

Type 2 : Controlled by Division : It is used or one produce. Mostly, Mostly, mechanical Parts.

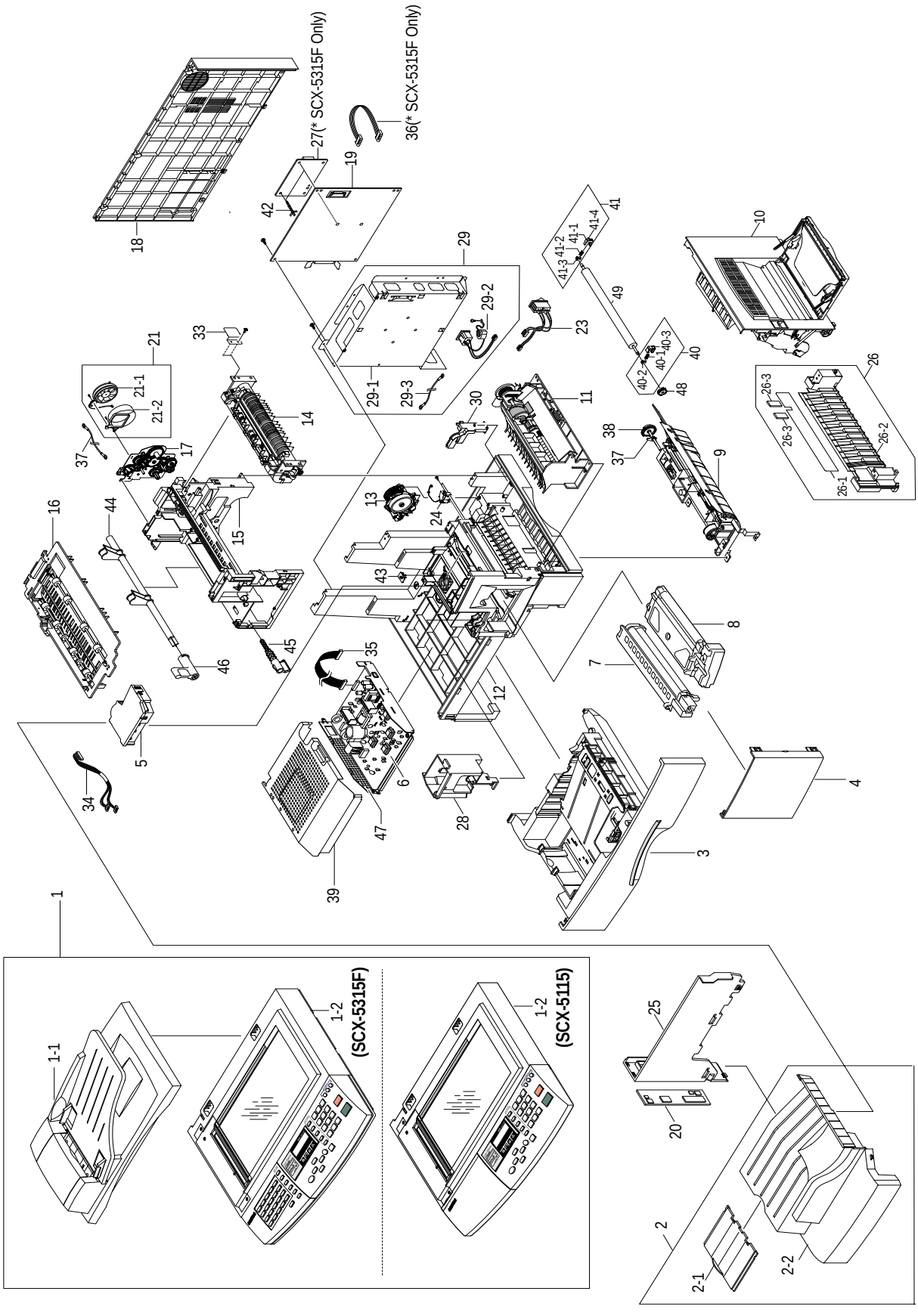
• **A/S privately used part :** It is only used for A/S .

• **Ass'y part :** Assembled by more than 2 Parts. If necessary part is not A/S Part, Ass'y part including necessary par can be used. It is shown in the diagram and drawing of SVC manual.

• Ass'y part and A/S privately used Part is distinguished by part Code and Description.
The are inscription type 2. It is recognized by Part character and front side of description.

DIVISION	PART CODE	DESCRIPTION
A/S Private	**81-****** (JB81-00039A)	AS-***** (AS-USE)
ASS'Y Part	**75-****** (JB75-00068A)	MEC-***** (MEC-CHUTE)
ASS'Y Part	**92-****** (JB92-01131A)	PBA ****** (PBA MAIN-CONTROLLER)
ASS'Y Part	**97-****** (JB97-01089A)	MEA ****** (MEA UNIT-PULLEY IDLE)

5-1. Main Exploded View & Parts List



Main Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
1	ELA HOU-SCANNER	**Refer to Info.**	1	O	SCX-5115
	ELA HOU-SCANNER	**Refer to Info.**	1	O	SCX-5315F
1-1	ELA HOU-ADF	JC96-02750A	1	O	
1-2	ELA HOU-PLATEN	**Refer to Info.**	1	O	SCX-5115
	ELA HOU-PLATEN	**Refer to Info.**	1	O	SCX-5315F
2	MEA UNIT-COVER PA EXIT ASS'Y	JC97-01556B	1	O	
2-1	PMO-TRAY EXTENTION MP NE	JC72-00354B	1	O	
2-2	PMO-COVER PAPER EXIT	JC72-00786B	1	O	
3	MEA UNIT-CASSETTE(KOR)	JC97-01736A	1	O	
4	MEA UNIT-COVER FRONT ASS'Y	JC97-01572B	1	O	
5	UNIT-LSU,600DPI,15	JC59-00014B	1	O	
6	ELA ETC-SHIELD SMPS LOWER	JC96-02422A	1	O	CHINA ONLY
	ELA ETC-SHIELD SMPS LOWER	JC96-02310B	1	O	110V
	ELA ETC-SHIELD SMPS LOWER	JC96-02317A	1	O	220V
7	ELA-OPC UNIT 15K D	*	1	X	
8	ELA-TONER UNIT 6K D	*	1	X	
9	ELA HOU-PICK UP	JC96-02715B	1	O	
10	ELA HOU-SIDE COVER	JC96-02183B	1	O	
11	ELA HOU-MP ASS'Y	JC96-02182A	1	O	
12	ELA HOU-BASE FRAME	JC96-02818A	1	O	
13	MEC-FEED ASS'Y	JC75-00143B	1	O	
14	ELA HOU-FUSER	JC96-02814A	1	O	110V
	ELA HOU-FUSER	JC96-02815A	1	O	220V
15	ELA HOU-FRAME MAIN ASS'Y	JC96-02184A	1	O	
16	MEA UNIT-EXIT ASS'Y	JC97-01643A	1	O	
17	ELA HOU-DRIVE(15PPM)	JC96-02741A	1	O	
18	PMO-COVER REAR	JC72-00788A	1	O	
19	PBA MAIN-MAIN	JC92-01480A	1	O	SCX-5115
19	PBA MAIN-MAIN	JC92-01479A	1	O	SCX-5315F
20	COVER-M-PANNEL MFP	JC63-00215B	1	O	SCX-5115
20	COVER-M-PANNEL MFP	JC63-00215A	1	O	SCX-5315F
21	ELA HOU-DUCT FAN	JC96-02311A	1	O	
21-1	FAN-DC	JC31-00012A	1	O	
21-2	PMO-DUCT FAN	JC72-00807A	1	O	
23	CBF HARNESS-SWITCH GRAY	JC39-00055B	1	O	
24	SOLENOID-PICK UP	JC33-00007A	1	O	

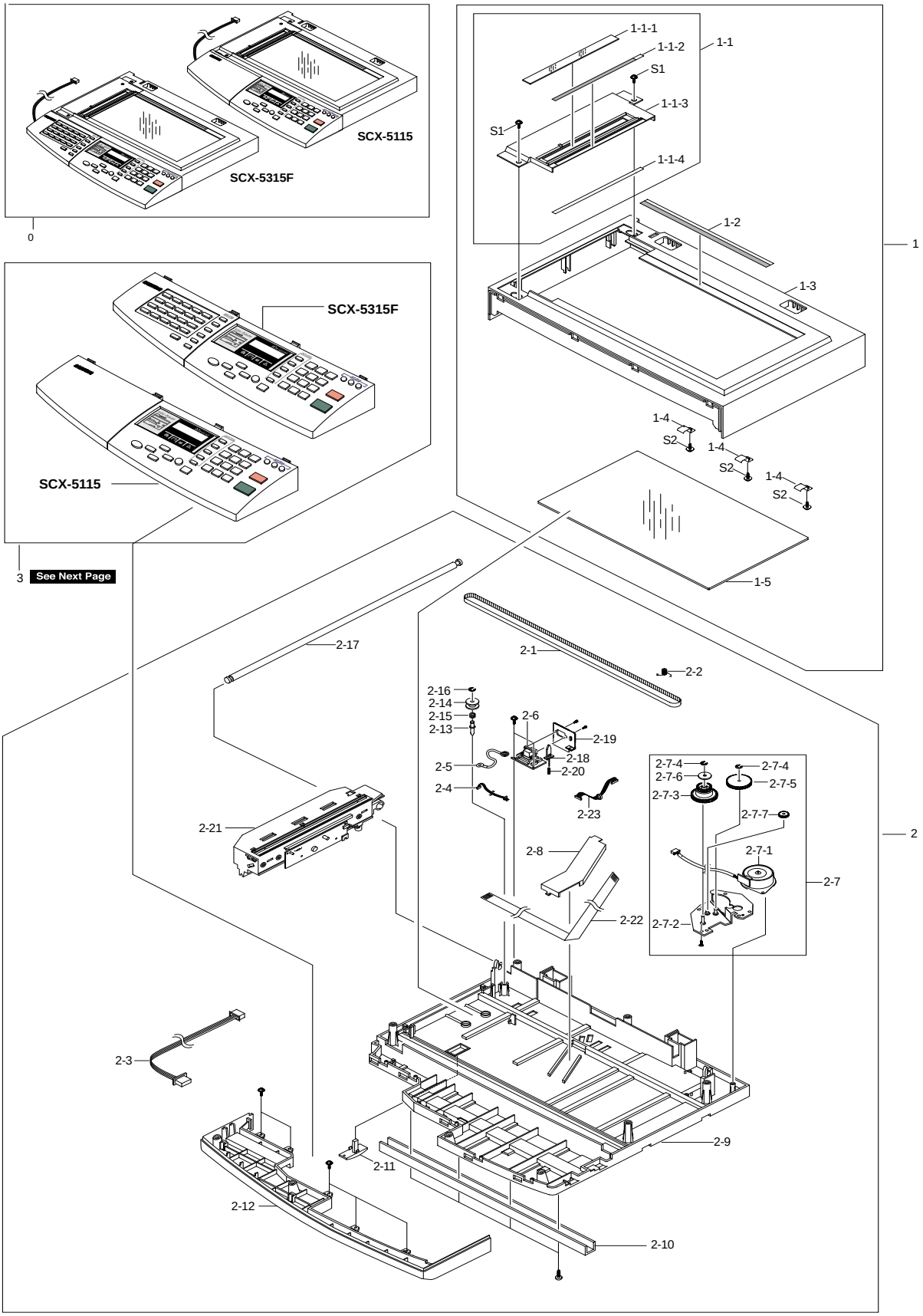
O : Service available X : Service not available

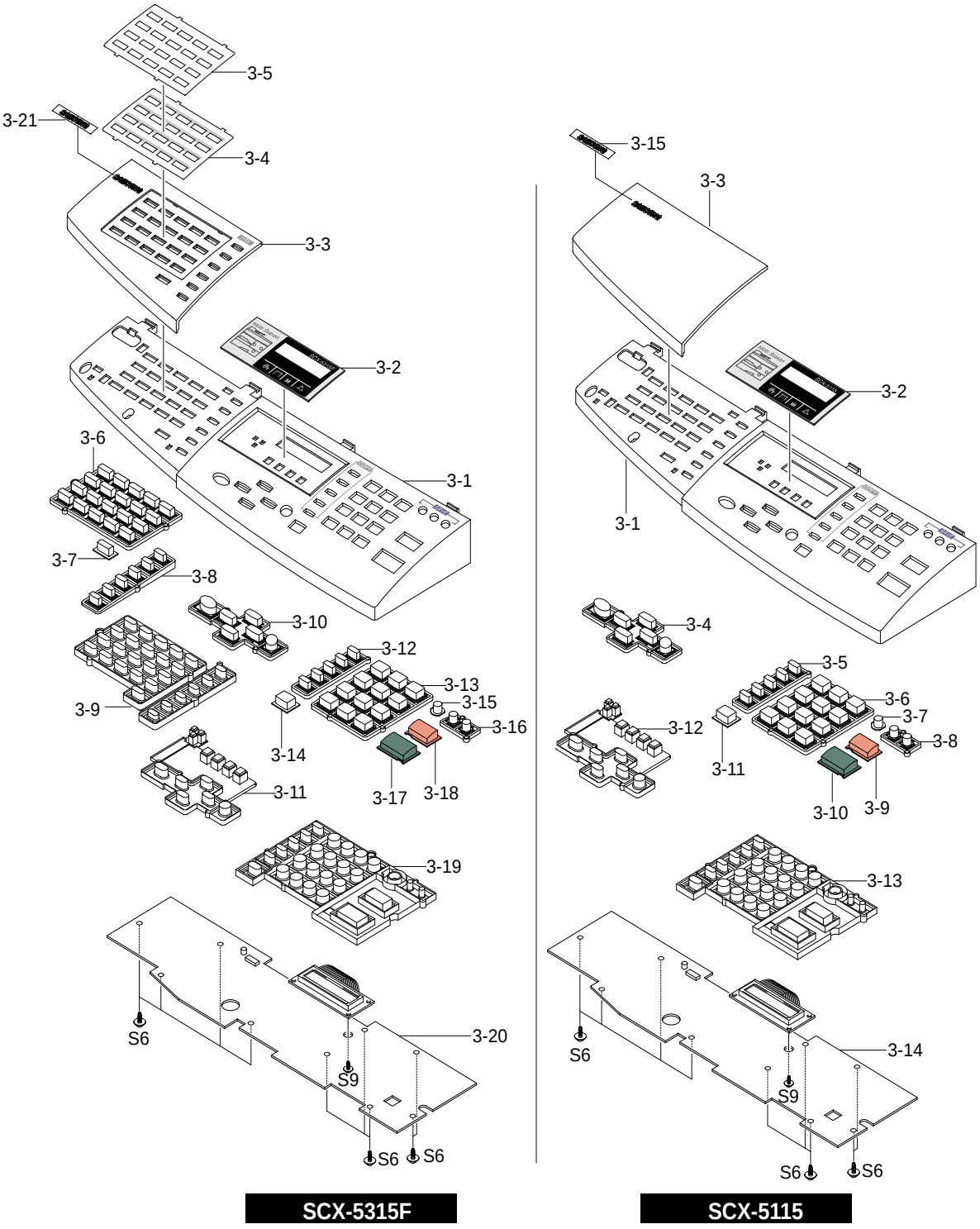
Main Parts List (Cont.)

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
25	PMO-COVER EXIT REAR	JC72-00790A	1	O	
26	MEA UNIT-GUIDE CST PA ASS'Y	JC97-01575A	1	O	
26-1	PPR-SHEET/GUIDE PAPER	*	1	X	
26-2	PMO-GUIDE CASSETTE RAIL	*	1	X	
26-3	SHEET-FEED	*	2	X	
27	PBA SUB-LIU	**Refer to Info.**	1	O	
28	PMO-DUMMY BASE FRAME	JC72-00789A	1	O	
29	ELA HOU-SHIELD MAIN LOWER	JC96-02835A	1	O	
29-1	SHIELD-P-MAIN LOWER	*	1	X	
29-2	CBF HARNESS-INLET(KOREA)	*	1	X	
29-3	CBF HARNESS-LIU GND	JB39-00103A	1	O	
30	PMO-COVER FEED AY	JC72-00801A	1	O	
31	PMO-COVER BRKT MOTER	JC72-00834A	1	O	
32	PMO-GUIDE PAPER OUT	JC72-00835A	1	O	
33	SHEET-CONNECTOR	JC63-00072A	1	O	
34	CBF HARNESS-LSU	JC39-00163A	1	O	
35	CBF HARNESS-POWER+HVPS	JC39-00162A	1	O	
36	CBF HARNESS-LIU	JB39-00104A	1	O	Only SCX-5315F
37	PMO-BEARING SHAFT	JC72-41191A	1	O	
38	GEAR-PICK_UP	JC66-00335A	1	O	
39	IPR-SHIELD SMPS UPPER	JC70-00248A	1	O	
40	MEA UNIT-HOLD GEAR ASS'Y	JC97-01573A	1	O	
40-1	SPRING ETC-TR_R	*	1	X	
40-2	PMO-BUSH	JC72-40228A	1	O	
40-3	PMO-HOLDER GEAR TR	*	1	X	
41	MEA UNIT-HOLD GND ASS'Y	JC97-01574A	1	O	
41-1	SPRING ETC-PLATE TR	*	1	X	
41-2	SPRING ETC-TR_L	*	1	X	
41-3	PMO-BUSH	JC72-40228A	1	O	
41-4	PMO-HOLDER GND TR	*	1	X	
42	SUPPORTER	6103-001048	2	O	
43	PMO-WINDOW SENSOR DEVE	JC72-00792A	1	O	
44	PMO-CAM JAM REMOVE	JC72-00799A	1	O	
45	PMO-LOCKER DEVE	JC72-00805A	1	O	
46	PMO-LEVER JAM REMOVE	JC72-00804A	1	O	
47	IPR-SHIELD SMPS LOWER	JC70-00247A	1	O	
48	GEAR-TRANSFER	JC66-40947A	1	O	
49	MEC-TRANSFER ROLLER	JC75-00148A	1	O	

O : Service available X : Service not available

5-2. Platen Ass'y Exploded View & Parts List





SCX-5315F **SCX-5115**

Platen Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-PLATEN	**Refer to Info.**	1	O	SCX-5315F
	ELA HOU-PLATEN	**Refer to Info.**	1	O	SCX-5115
1	ELA HOU-SCAN UPPER	JC81-01688A	1	O	
1-1	AS-DUMMY UPPER AS (FRV)	JC81-00426A	1	O	
1-1-1	MCT-GLASS ADF	*	1	X	
1-1-2	LABEL(R)-REGISTRATION EDGE(L)	*	1	X	
1-1-3	PMO-DUMMY UPPER	*	1	X	
1-1-4	SHEET-DUMMY UPPER	*	1	X	
1-2	PPR-REGISTRATION EDGE(F)	JC72-00809A	1	O	
1-3	PMO-COVER SCAN UPPER	JC72-00758A	1	O	
1-4	IPR-HOLDER GLASS	*	3	X	
1-5	MCT-GLASS SCANNER(LEGAL)	JC74-00018A	1	O	
2	ELA HOU-SCAN LOWER	JC96-02706B	1	O	
2-1	BELT-TIMING GEAR	6602-001090	1	O	
2-2	SPRING ETC-BELT	JB61-00059A	1	O	
2-3	CBF HARNESS-OPE	JC39-00167A	1	O	
2-4	CBF HARNESS-MAIN-ENGINE	JC39-00030A	1	O	
2-5	CBF HARNESS-DRIVER GND	*	1	X	
2-6	PBA SUB-D_SUB	JC92-01381A	1	O	
2-7	ELA HOU-SCAN MOTOR	JC96-02751A	1	O	
2-7-1	MOTOR STEP-SCAN	JB31-00011A	1	O	
2-7-2	BRACKET-MOTOR PLATEN	*	1	X	
2-7-3	GEAR-TIMING	JC66-00531A	1	O	
2-7-4	RING-E	6044-000125	3	O	
2-7-5	GEAR-REDUCTION73/37	JC66-00530A	1	O	
2-7-6	PMO-HOLDER BELT	JB72-00764A	1	O	
2-7-7	GEAR IDLE	JB66-00083A	1	O	
2-8	COVER-M-CCD CABLE	JC63-00158A	1	O	
2-9	COVER-SCAN LOWER(UMAX)	JC63-00157A	1	O	
2-10	IPR-CHANNEL BASE FRAME	JC70-00239A	2	O	
2-11	HOLDER-M-CCD(UMAX)	JC61-00703A	1	O	
2-12	PMO-COVER DUMMY LOWER(C)	JC72-00794A	1	O	
2-13	ICT-INSERT SHAFT	*	1	X	
2-14	PMO-PULLEY	JB72-00763A	1	O	
2-15	PMO-HOLDER BELT	JB72-00764A	1	O	
2-16	RING-E	6044-000125	1	O	
2-17	SHAFT-CCD(UMAX)	JC66-00532A	1	O	
2-18	PMO-LEVER SENSOR	JC72-00755A	1	O	
2-19	IPR-BRK SCAN BD	JC70-00228A	1	O	
2-20	SPRING ETC-EXIT	*	1	X	
2-21	ELA HOU-CCD MODULE	JC96-02759A	1	O	
2-22	CBF SIGNAL-CCD FFC	JC39-00236A	1	O	
2-23	CBF HARNESS-SCAN MOTOR	JB39-00077A	1	O	
3	ELA HOU-OPE	See Next Page			

O : Service available X : Service not available

SCX-5315F (OPE)

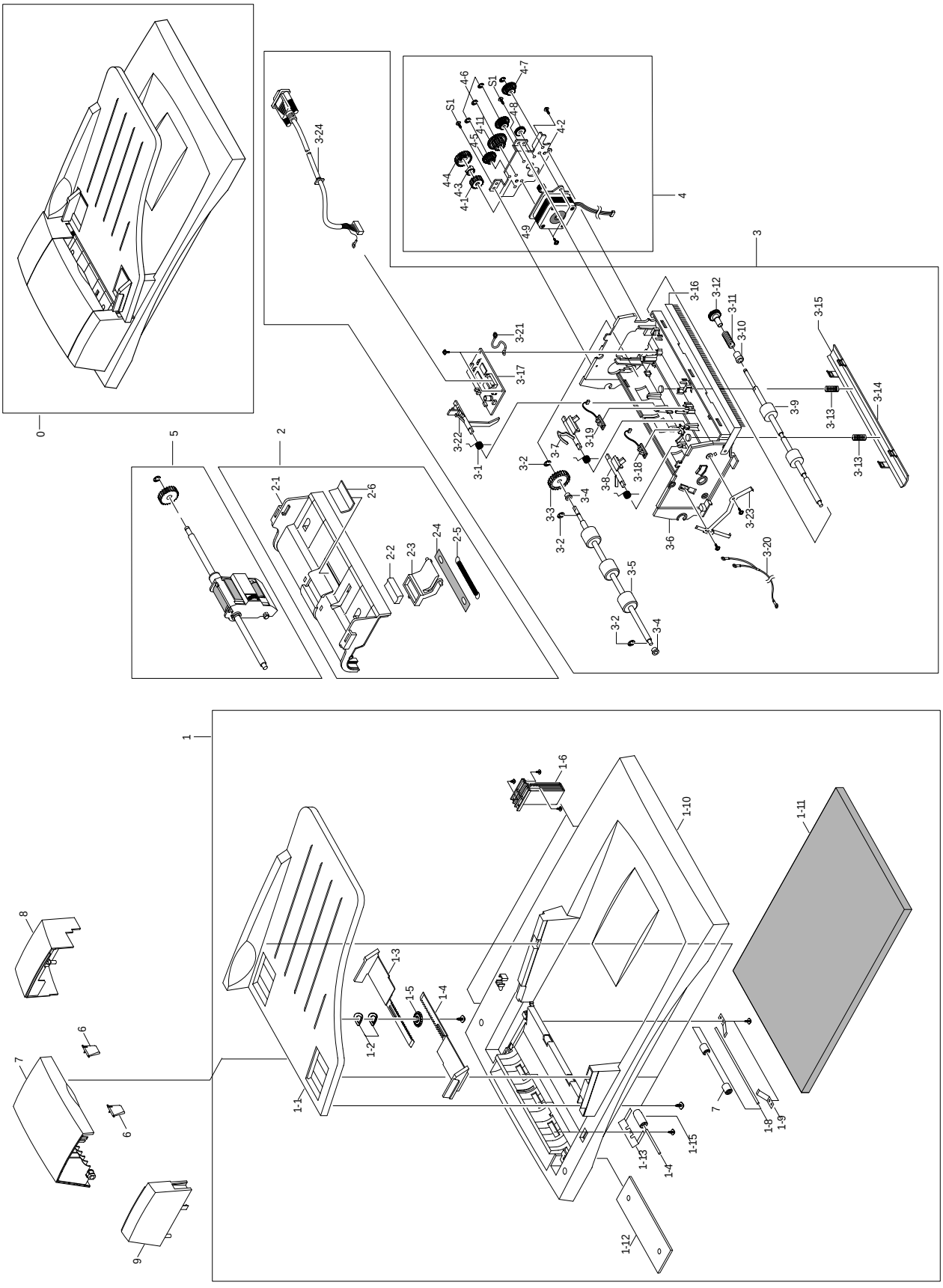
NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
3	ELA HOU-OPE	**Refer to Info.**	1	O	SCX-5315F
3-1	PMO-OPE COVER	**Refer to Info.**	1	O	
3-2	WINDOW-LCD (4IN1)	**Refer to Info.**	1	O	
3-3	PMO-COVER DUMMY OPE(M)	**Refer to Info.**	1	O	
3-4	PCT-ONETOUCH PAPER	**Refer to Info.**	1	O	
3-5	PCT-ONETOUCH CARD	JC72-00871A	1	O	
3-6	PMO-KEY ONETOUCH	JC72-00860A	1	O	
3-7	PMO-KEY SHIFT	JC72-00861A	1	O	
3-8	PMO-KEY FAX	JC72-00862A	1	O	
3-9	RMO-RUBBER ONETOUCH	JC73-00104A	1	O	
3-10	PMO-KEY SCROLL	JC72-00866A	1	O	
3-11	RMO-RUBBER SCROLL	JC73-00106A	1	O	
3-12	PMO-KEY COPY	JC72-00863A	1	O	
3-13	PMO-KEY TEL	JC72-00865A	1	O	
3-14	PMO-KEY OHD	JC72-00864A	1	O	
3-15	PMO-KEY SAVE(T)	JC72-00923A	1	O	
3-16	PMO-KEY SAVE	JC72-00867A	1	O	
3-17	PMO-KEY START	JC72-00868A	1	O	
3-18	PMO-KEY STOP	JC72-00869A	1	O	
3-19	RMO-RUBBER TEL	JC73-00105A	1	O	
3-20	PBA SUB-OPE(KOR)	JC81-00779A	1	O	
3-21	NPR-BADGE(45)	*	1	X	

SCX-5115 (OPE)

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
3	ELA HOU-OPE(SEC)	**Refer to Info.**	1	O	SCX-5115
3-1	PMO-OPE COVER	**Refer to Info.**	1	O	
3-2	WINDOW-LCD(3IN1)	**Refer to Info.**	1	O	
3-3	PMO-COVER DUMMY OPE(C)	JC72-00859A	1	O	
3-4	PMO-KEY SCROLL	JC72-00866A	1	O	
3-5	PMO-KEY COPY	JC72-00863A	1	O	
3-6	PMO-KEY TEL	JC72-00865A	1	O	
3-7	PMO-KEY SAVE(T)	JC72-00923A	1	O	
3-8	PMO-KEY SAVE	JC72-00867A	1	O	
3-9	PMO-KEY STOP	JC72-00869A	1	O	
3-10	PMO-KEY START	JC72-00868A	1	O	
3-11	PMO-KEY OHD	JC72-00864B	1	O	
3-12	RMO-RUBBER SCROLL	JC73-00106A	1	O	
3-13	RMO-RUBBER TEL	JC73-00105A	1	O	
3-14	PBA SUB-OPE(KOR)	JC81-00779A	1	O	
3-15	NPR-BADGE(45)	*	1	X	

O : Service available X : Service not available

5-3. ADF ASS'Y Exploded View & Parts List



ADF Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-ADF	JC96-02750A	1	O	
1	MEA UNIT-PLATEN COVER	JC97-01722A	1	O	
1-1	PMO-TX STACKER	JC72-00745A	1	O	
1-2	IPR-WASHER SPRING CU	JF70-10616A	2	O	
1-3	PMO-DOC GUIDE L	JC72-00839B	1	O	
1-4	PMO-DOC GUIDE R	JC72-00838B	1	O	
1-5	PMO-GEAR PINION	JF72-41354A	1	O	
1-6	MEA UNIT-HINGE	JC97-01731A	2	O	
1-7	RPR-ROLLER EXIT IDLE	JC73-00091A	2	O	
1-8	IPR-SHAFT EXIT	JC70-00242A	1	O	
1-9	NPR-SPRING PINCH DRIVE	JB71-00038A	2	O	
1-10	PMO-COVER PLATEN	JC72-00738A	1	O	
1-11	PPR-SPONG SHEET	JC72-00751A	1	O	
1-12	SHEET ABS-SHEET PLATEN(PET)	JC72-00750B	1	O	
1-13	IPR-SPRING PINCH	JC70-00260A	3	O	
1-14	ICT-SHAFT PINCH	*	3	X	
1-15	PMO-ROLL PINCH	JG72-40663A	3	O	
2	MEA UNIT-ADF UPPER ASS'Y	JC97-01581A	1	O	
2-1	PMO-COVER ADF UPPER	JC72-00736A	1	O	
2-2	RMO-ADF RUBBER	JB73-00052A	1	O	
2-3	PMO-HOLDER ADF	JB72-00825A	1	O	
2-4	RPR-SPONGE ADF	*	1	X	
2-5	SPRING ETC-COIL ADF	JC61-00040A	1	O	
2-6	SHEET-ADF	JC63-00079A	1	O	
3	ELA HOU-ADF LOWER ASS'Y	JC81-00434A	1	O	
3-1	SPRING ETC-TORSION DOC (CC2-F)	JB61-00076A	3	O	
3-2	RING-C	*	4	X	
3-3	GEAR-ADF 38	JB66-00103A	1	O	
3-4	PMO-BUSH	JB72-00819A	2	O	
3-5	MEC-ROLLER DRIVER	JC75-00149A	1	O	
3-6	PMO-COVER ADF LOWER	JC72-00735A	1	O	
3-7	PMO-ACTUATOR SENSOR DOC	JB72-00837A	1	O	
3-8	PMO-ACTUATOR SENSOR REGI	JC72-00747A	1	O	
3-9	MEC-ROLLER EXIT	JC75-00150A	1	O	
3-10	PMO-BUSHING HOLDER	JG72-40732A	1	O	
3-11	SPRING ETC-CLUTCH	JC61-00062A	1	O	
3-12	GEAR-EXIT 23	JC66-00323A	1	O	
3-13	SPRING ETC-WHITE BAR	JC61-00548A	1	O	
3-14	IPR-BRKT WHITE BAR	JC70-00225A	1	O	
3-15	PPR-WHITE BAR SHEET	JC72-00752A	1	O	

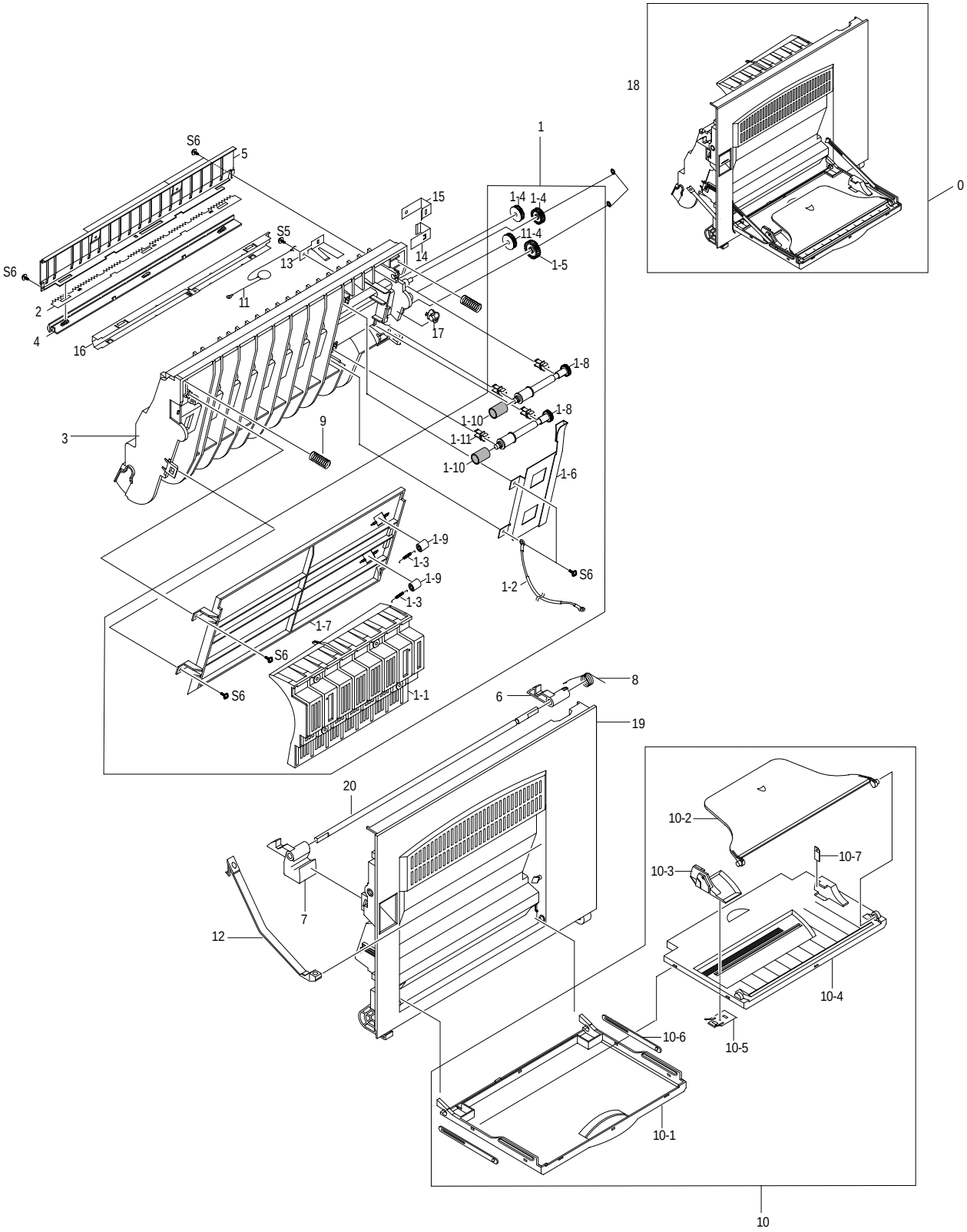
O : Service available X : Service not available

ADF Ass'y Parts List(Cont.)

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
3-16	TAPE ETC-ANTI BRUSH	*	1	X	
3-17	PBA SUB-ADF	JC81-00437A	1	O	
3-18	PBA SUB-ADF POS SEN	JC92-01365A	1	O	
3-19	PBA SUB-ADF DET SEN	JC92-01366A	1	O	
3-20	CBF HARNESS-ADF ROLLER GND	JC39-00187A	1	O	
3-21	CBF HARNESS-DRIVER GND	JB39-00065A	1	O	
3-22	PMO-ACTUATOR SENSOR SCAN	*	1	X	
3-23	NPR-SPRING GND	JC71-00031A	1	O	
3-24	CBF D SUB CABLE-ADF_MAIN CABLE	JC39-00190A	1	O	
4	ELA HOU-ADF MOTOR ASS'Y	JC81-00435A	1	O	
4-1	GEAR-CLUTCH 29	*	1	X	
4-2	IPR-BRKT ADF MOTOR	*	1	X	
4-3	PMO-WHITE CLUTCH SUB 29	*	1	X	
4-4	GEAR-CLUTCH 39	*	1	X	
4-5	GEAR-IDLE20/33	*	2	X	
4-6	RING-C	*	7	X	
4-7	GEAR-IDLE17/35	*	2	X	
4-8	GEAR-IDLE25	*	1	X	
4-9	MOTOR STEP-ADF	JC31-00017A	1	O	
4-10	GEAR-JAM REMOVE	*	1	X	
4-11	GEAR-REDUCTION 45/19	*	1	X	
5	MEA UNIT-PICKUP ASS'Y	JC97-01582A	1	O	
6	PMO-GUIDE PAPER	JB72-00843A	2	O	
7	PMO-COVER OPEN	JC72-00737A	1	O	
8	PMO-COVER SIDE L	JC72-00739A	1	O	
9	PMO-COVER SIDE R	JC72-00740A	1	O	

O : Service available X : Service not available

5-4. Side Cover Ass'y Exploded View & Parts List

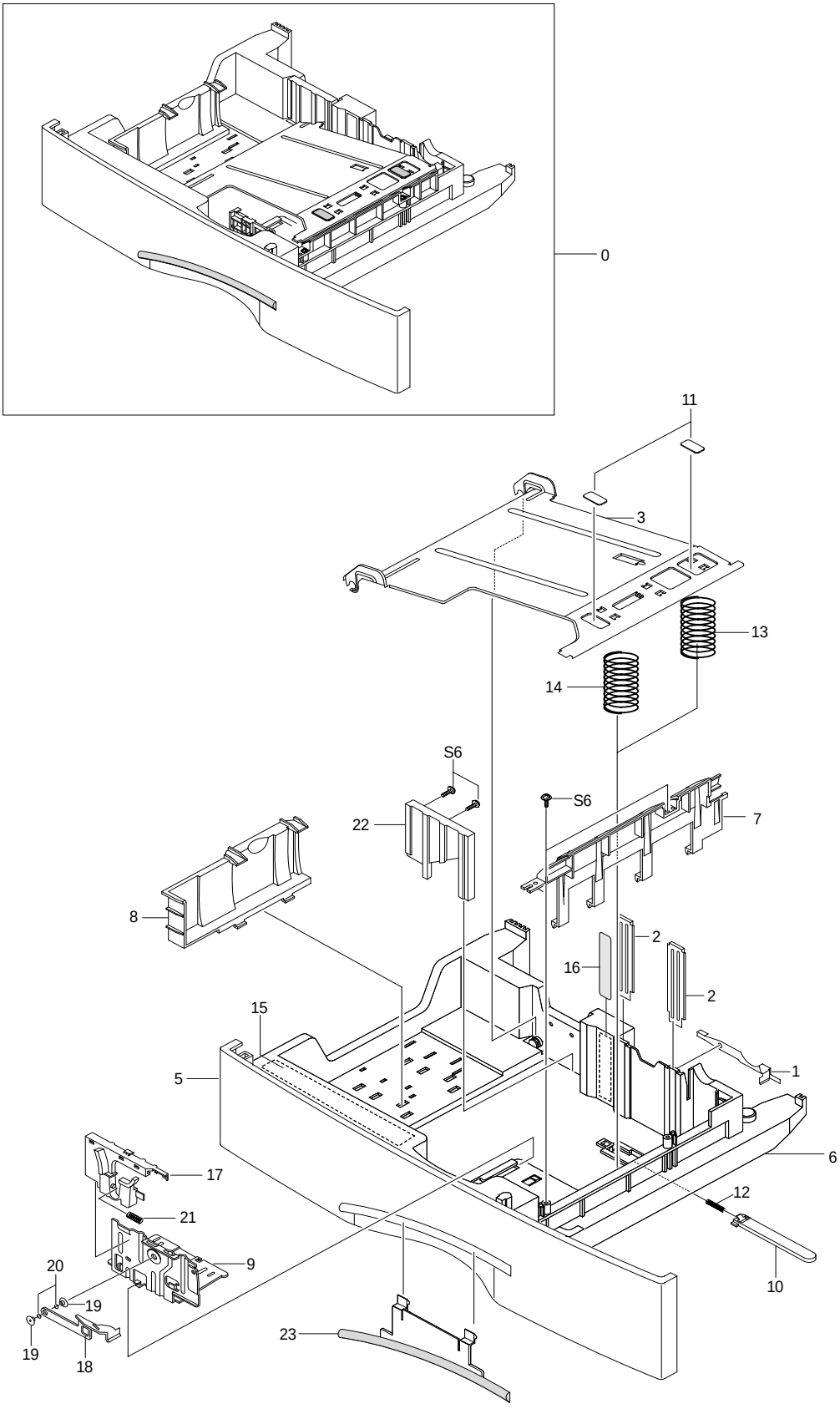


Side Cover Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-SIDE COVER	JC96-02183B	1	O	
1	MEA UNIT-DUPLEX ASS'Y	*	1	X	
1-1	PMO-GUIDE DP SIDE	JC72-00806A	1	O	
1-2	CBF HARNESS-SCAN GND	*	1	X	
1-3	SPRING ETC-FUSER EXIT	JC61-70976A	2	O	
1-4	GEAR-DUP IDLER 17	JC66-00341A	3	O	
1-5	GEAR-MP/DUP DRV	JC66-00346A	1	O	
1-6	IPR-BRKT G DUP	JC70-00233A	1	O	
1-7	PMO-GP LOWER DP	JC72-00732A	1	O	
1-8	PMO-SHAFT DUP DRIVER	JC72-00764A	2	O	
1-9	PMO-ROLLER_EXIT	*	2	X	
1-10	RPR-RUBBER EXIT	JC73-10203A	2	O	
1-11	PMO-BUSHING TX(B4)	JG72-40744A	1	O	
2	IPR-PLATE SAW	JC70-10232A	1	O	
3	PMO-FEED FRAME	JC72-00731A	1	O	
4	PMO-HOLDER SAW	JC72-41213A	1	O	
5	IPR-BRACKET GUIDE A	JC70-00229A	1	O	
6	PMO-LOCKER SIDE R	JC72-00763A	1	O	
7	PMO-LOCKER OPEN	JC72-00762B	1	O	
8	SPRING ETC-LOCKER TORSION	JC61-00479A	1	O	
9	SPRING ETC-FEED	JC61-00478A	2	O	
10	MEA UNIT-TRAY	*	1	X	
10-1	PMO-TRAY CASE,MP	JC72-00776A	1	O	
10-2	PMO-TRAY EXT,MP	JC72-00778A	1	O	
10-3	PMO-SIDE GUIDE MP	JC72-00547G	1	O	
10-4	PMO-TRAY COVER,MP	JC72-00777A	1	O	
10-5	IPR-GUIDE LATCH	JB70-10906A	1	O	
10-6	PMO-TRAY LINK,MP	JC72-00857A	1	O	
10-7	LABEL(R)-HEIGHT,MP	JC68-00697A	1	O	
11	CBF HARNESS-OPE GND	JC39-00036A	1	O	
12	PMO-TIE STOPPER	JC72-00766A	2	O	
13	IPR-BRKT GROUND B	JC70-00230A	1	O	
14	IPR-BRKT GROUND TR	JC70-00231A	1	O	
15	IPR-BRKT GROUND A	JC70-00232A	1	O	
16	IPR-BRACKET GUIDE B	JC70-00234A	1	O	
17	PMO-BUSHING FEED	JC72-00730A	1	O	
18	RING-CS	6044-000001	2	O	
19	PMO-SIDE COVER	JC72-00765A	1	O	
20	ICT-SHAFT LOCKER	JC70-00266A	1	O	

O : Service available X : Service not available

5-5. Cassette Ass'y Exploded View & Parts List

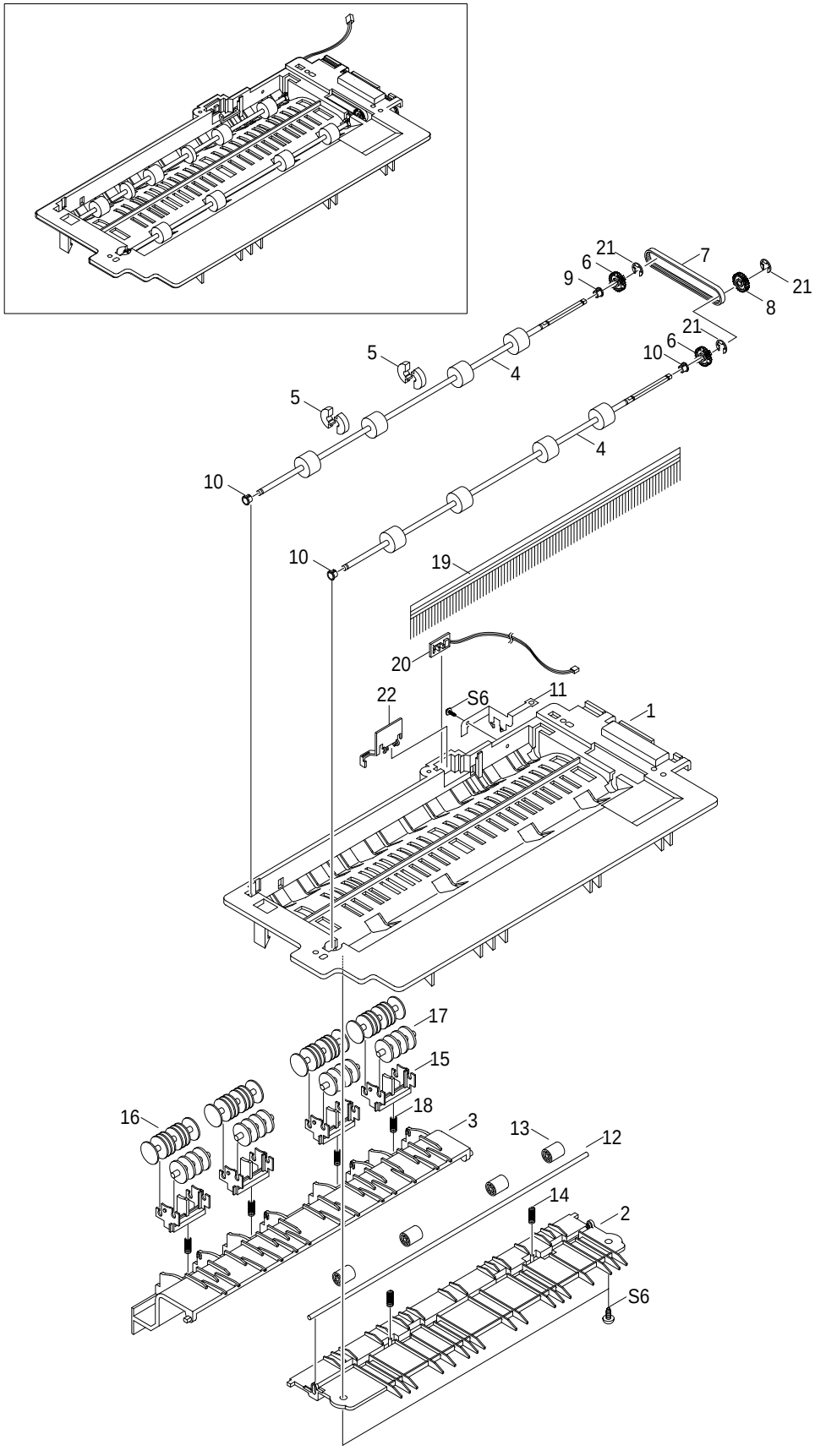


Cassette Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	MEC-CASSETTE PLUS ASS'Y	JC97-01736A	1	O	
1	IPR-FINGER	JC70-00220A	1	O	
2	PLATE GUIDE PAPER	JC61-00831A	2	O	
3	IPR-PLATE K/UP	JC70-00221A	1	O	
5	PMO-COVER CASSETTE	JC72-00795A	1	O	
6	PMO-FRAME CASSETTE	*	1	X	
7	GUIDE FRONT CST PLUS	*	1	X	
8	PMO-GUIDE REAR	JC72-00717A	1	O	
9	GUIDE SIDE CST	*	1	X	
10	PMO-LOCKER PLATE	JC72-41210A	1	O	
11	PAD-CST PLUS	*	2	X	
12	SPRING-LOCKER PLATE	JG61-70531A	1	O	
13	SPRING CS RE	*	1	X	
14	SPRING CS FR	*	1	X	
15	LABEL(R)-INSTRUCTION CST PLUS	*	1	X	
16	LABEL(R)-HEIGHT CST	*	1	X	
17	GUIDE SIDE HANDLE	*	1	X	
18	IPR FINGER LEFT	JC70-00325A	1	O	
19	PMO-BUSHING FINGER, F	JC61-00653A	2	O	
20	WASHER PLAIN	*	2	X	
21	SPRING WHITE BAR	JC61-00548A	1	O	
22	GUIDE SUB WALL	JC61-00840A	1	O	
23	PMO-IMPACT CASSETTE	JC72-00877A	1	O	

O : Service available X : Service not available

5-6. Exit Ass'y Exploded View & Parts List

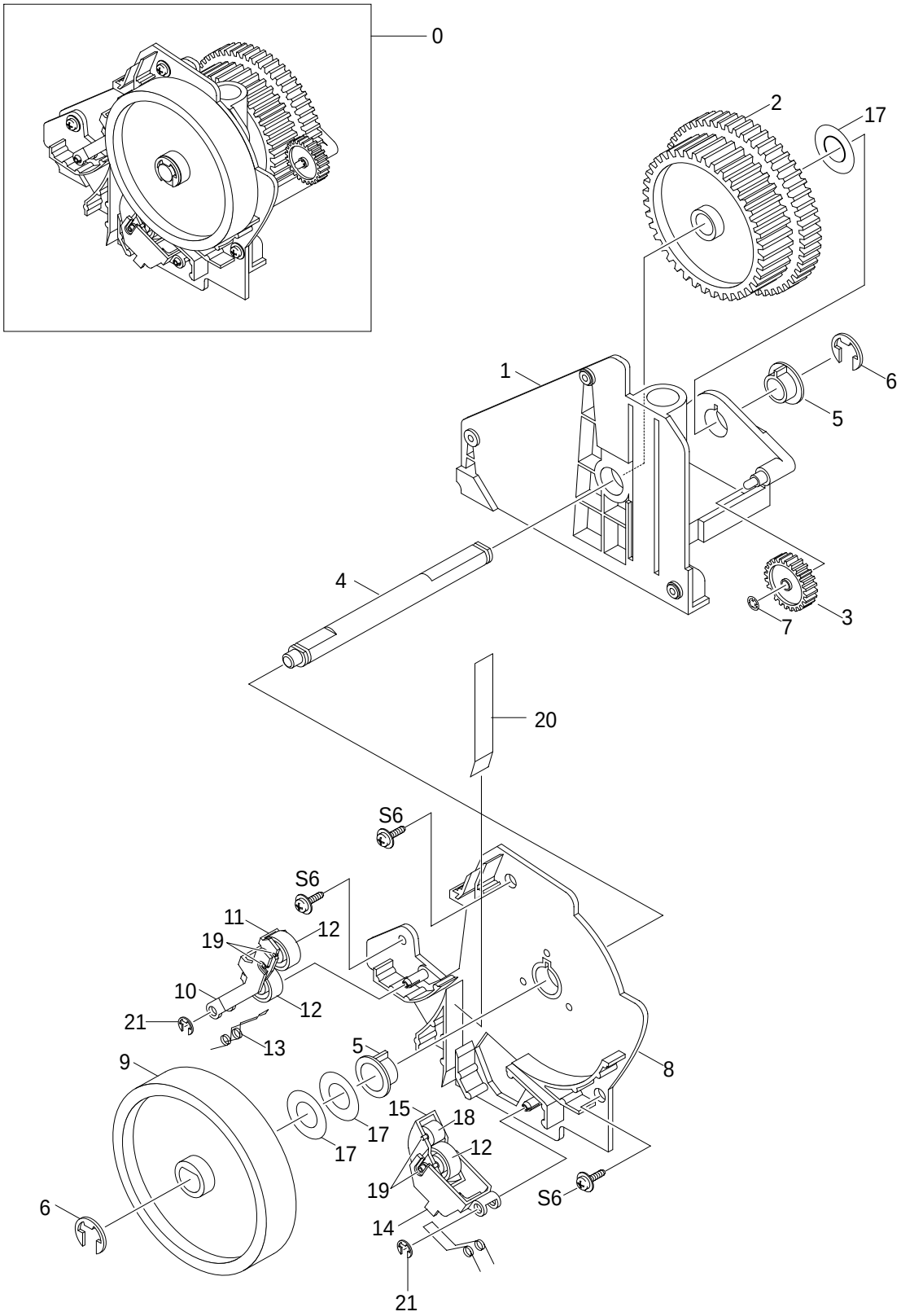


Exit Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	MEA UNIT-EXIT ASS'Y	JC97-01643A	1	O	
1	PMO-GUIDE-EXIT UPPER	JC72-00708A	1	O	
2	PMO-GUIDE-EXIT LOWER	JC72-00710A	1	O	
3	PMO-GUIDE-JAM REMOVE	*	1	X	
4	MEC-ROLLER EXIT DRV	JC75-00127A	2	O	
5	PMO-ROLLER DECURL	JC72-00833A	4	O	
6	PMO-PULLEY DUPLEX	JC72-40980A	2	O	
7	BELT-TIMING GEAR	6602-001084	1	O	
8	GEAR-DUPLEX	JC66-40912A	1	O	
9	PMO-BEARING LARGE DP	JC72-00885A	3	O	
10	PMO-BEARING LARGE DP	JC72-40978A	1	O	
11	IPR-GROUND-EXIT	*	1	X	
12	ICT-SHAFT-EXIT LOWER ID	*	1	X	
13	PMO-ROLLER_EXIT	*	4	X	
14	SPRING ETC-EXIT ROLL FD	*	2	X	
15	HOLDER-EXIT(MC)	*	4	X	
16	PMO-ROLLER FD F	JC72-41007A	4	O	
17	PMO-ROLLER FD R	JC72-41008A	4	O	
18	SPRING ETC-EXIT LOWER IDLE	*	4	X	
19	MEC-BRUSH ANTISTATIC	JC75-00095A	1	O	
20	PBA SUB-BIN_FULL_SEN.	JC92-01400A	1	O	
21	RING-C	*	3	X	
22	PMO-LEVER-STACKING	JC72-00709A	1	O	

O : Service available X : Service not available

5-7. Feeder Ass'y Exploded View & Parts List

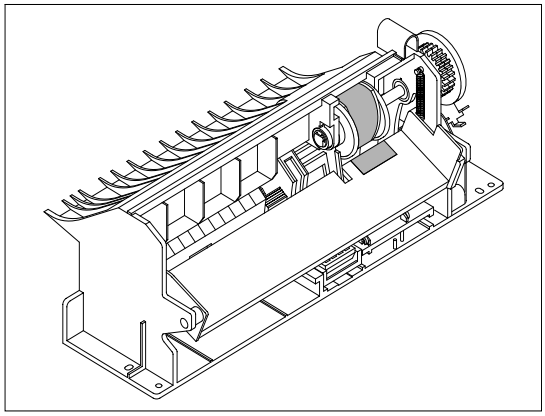


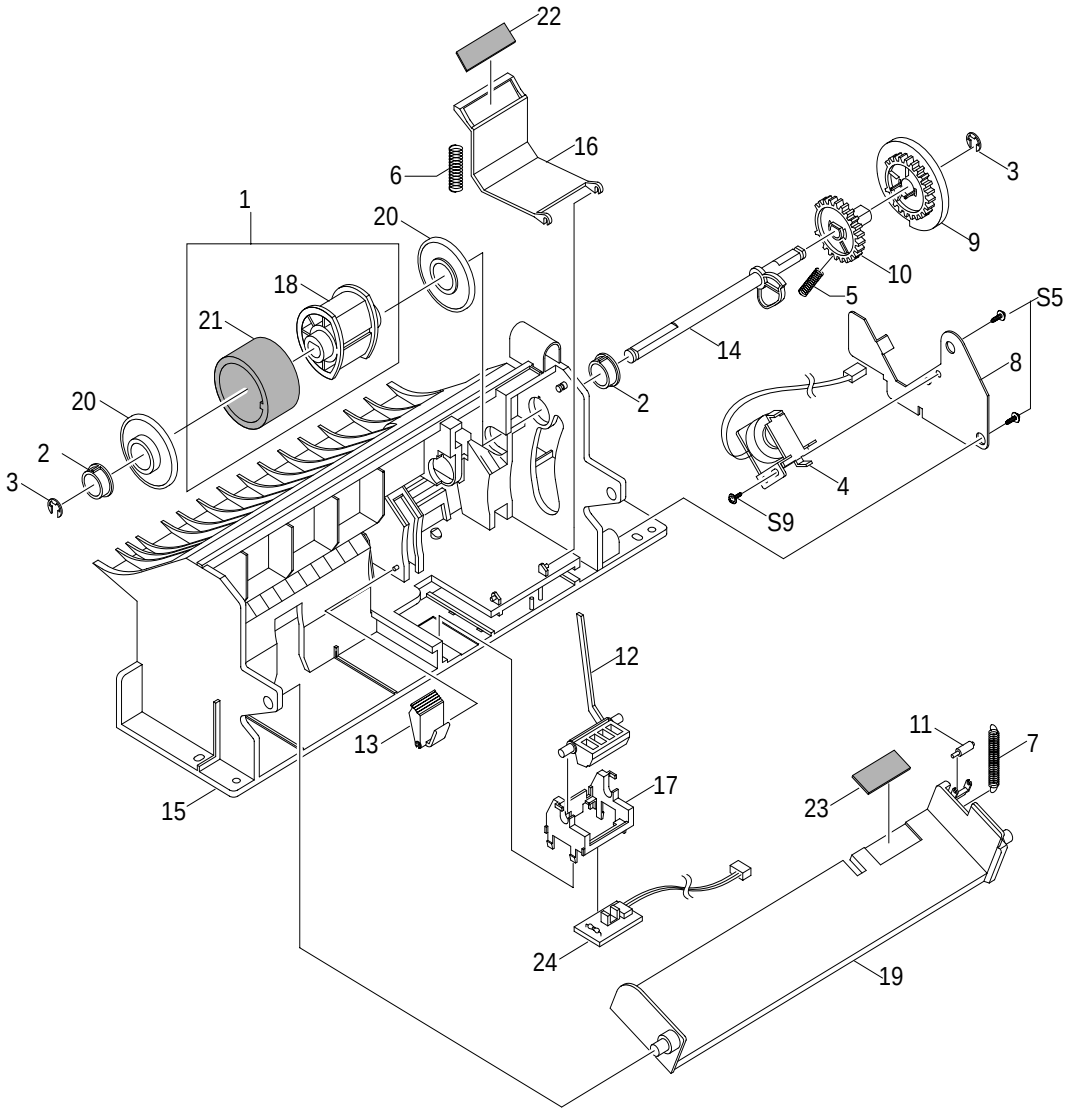
Feeder Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	MEA-FEED ASS'Y	JC75-00143B	1	O	
1	PMO-FRAME FEED	*	1	X	
2	GEAR-FEED	JC66-00332A	1	O	
3	GEAR-MP/DUP DRV	*	1	X	
4	ICT-SHAFT FEED	*	1	X	
5	BEARING-PICKUP	*	2	X	
6	RING-E	*	2	X	
7	RING-CS	*	1	X	
8	PMO-BRKT FEED	*	1	X	
9	PMO-ROLLER FEED	JC72-00727A	1	O	
10	PMO-HOLDER PINCH C	*	1	X	
11	PMO-HOLDER PINCH SUB	*	1	X	
12	PMO-ROLLER FEED L	JC72-40261A	3	O	
13	SPRING-FEED CAST	*	1	X	
14	PMO-HOLDER PINCH M	*	1	X	
15	PMO-SUB HOLDER FEED	*	1	X	
16	SPRING-FEED MP	*	1	X	
17	WASHER-PLAIN	*	3	X	
18	PMO-ROLLER FEED S	*	1	X	
19	IPR-SHAFT FEED IDLER	*	4	X	
20	SHEET FEEDER	*	1	X	
21	E-RING	*	2	X	Ø3

O : Service available X : Service not available

5-8. MP Ass'y Exploded View & Parts List



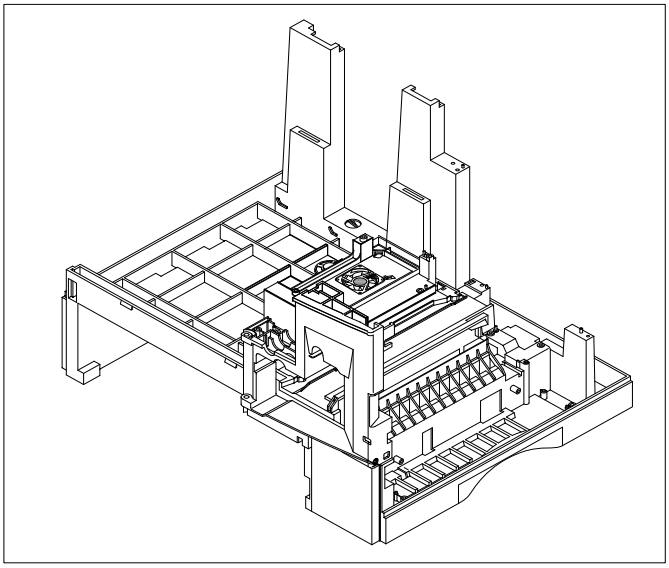


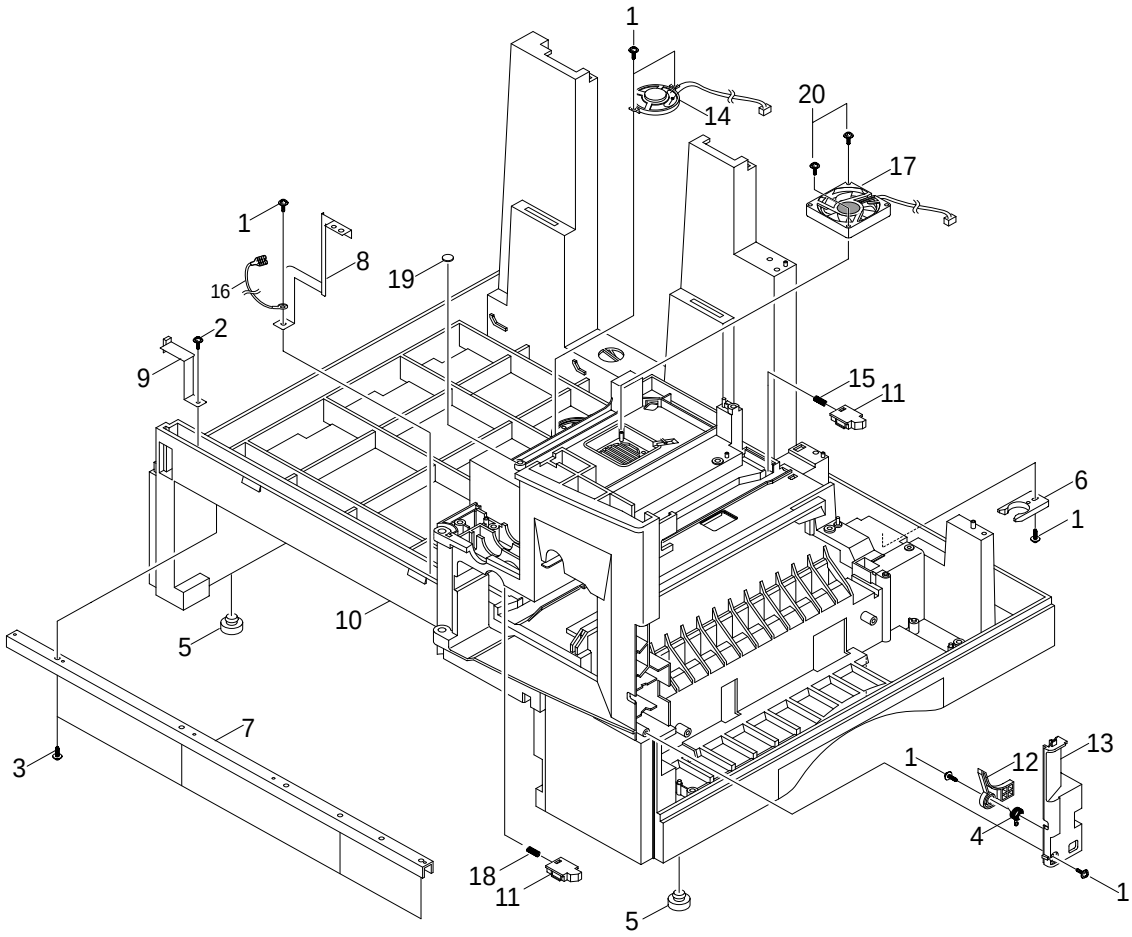
MP Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-MP ASS'Y	JC96-02182A	1	O	
1	A/S-PICK UP, MP AS(FRU)	JC81-00427A	1	O	
2	PMO-BUSHING PICKUP,MP	JC72-41364A	2	O	
3	RING-E	6044-000125	2	O	
4	SOLENOIDE,MP	JC33-00006A	1	O	
5	SPRING-CAM MP	JC61-00003A	1	O	
6	SPRING-PICK UP,MP	*	1	X	
7	SPRING-KNOCKUP,MP	JC61-00483A	1	O	
8	IPR-BRACKET SOLENOIDE	*	1	X	
9	PMO-HOLDER CAM MPF	*	1	X	
10	PMO-GEAR P/U MPF	*	1	X	
11	PMO-ROLLER CAM.MP	*	1	X	
12	PMO-ACTUATOR,MP	JC72-00767A	1	O	
13	PMO-ADJUSTER,MP	JC72-00768A	1	O	
14	PMO-CAM PICK UP,MP	JC72-00769A	1	O	
15	PMO-FRAME,MP	JC72-00770A	1	O	
16	PMO-HOLDER PAD,MP	JC72-00771A	1	O	
17	PMO-HOLDER SENSOR,MP	JC72-00772A	1	O	
18	PMO-HOUSING PICK UP,MP	*	1	X	
19	PMO-PLATE KNOCK UP,MP	*	1	X	
20	PMO-IDLE PICK UP,MP	JC72-41027A	2	O	
21	RPR-RUBBER PICK UP,MP	*	1	X	
22	RPR-RCT-PAD-PICKUP,MP	JC73-00090A	1	O	
23	RPR-PAD KNOCK UP,MP	JC73-10906A	1	O	
24	PBA SUB-MP SEN	JC92-01362A	1	O	

O : Service available X : Service not available

5-9. Base Frame Exploded View & Parts List



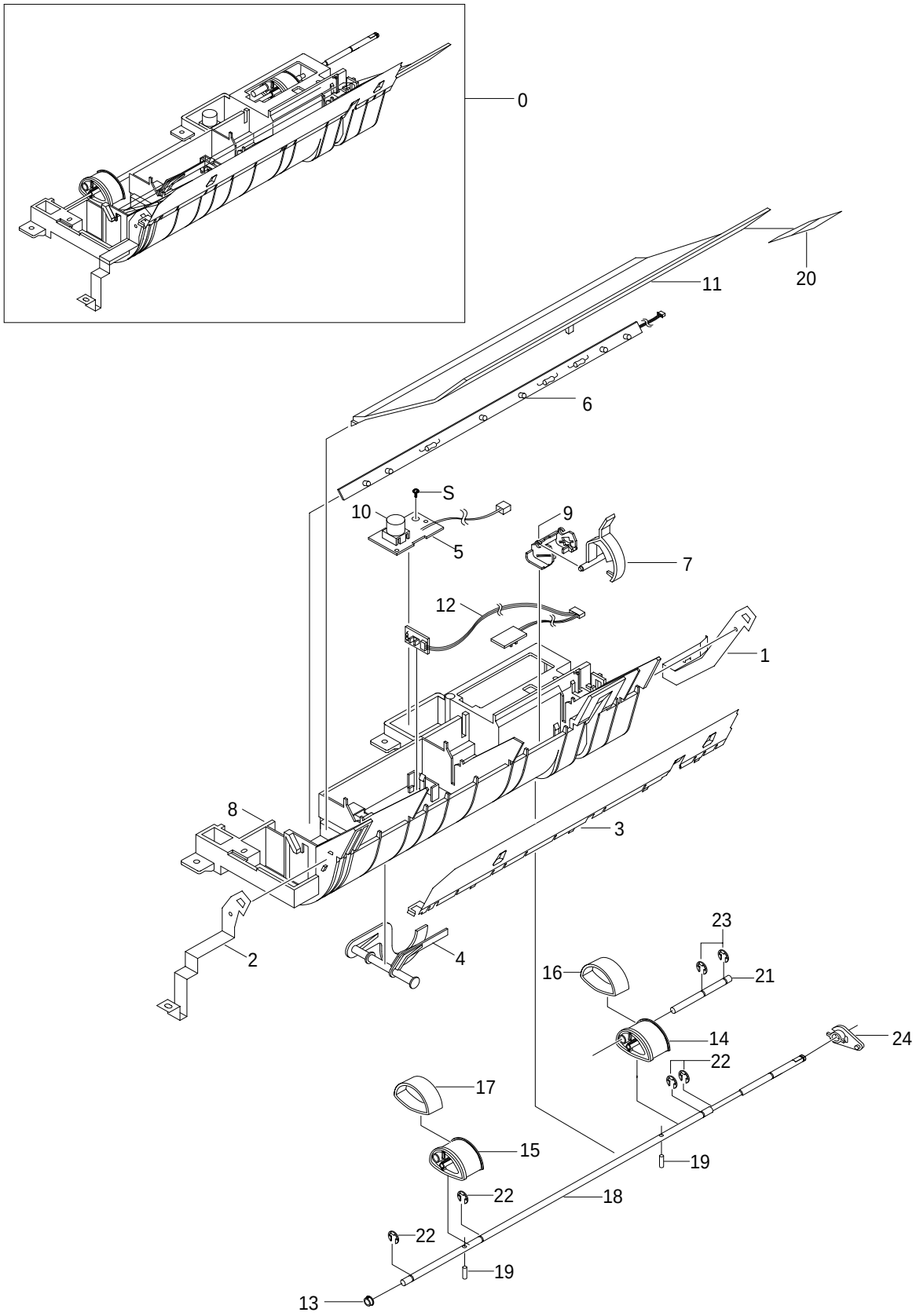


Base Frame Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-BASE FRAME	JC96-02818A	1	O	SCX-5315F
	ELA HOU-BASE FRAME	JC96-02818B	1	O	SCX-5115
1	SCREW-TAPTITE	*	5	X	
2	SCREW-TAPTITE	*	2	X	
3	SCREW-TAPTITE	*	4	X	
4	SPRING ETC-TORSION	*	1	X	
5	FOOT-ML80	JC61-40001A	2	O	
6	CAM-CATCH	*	1	X	
7	IPR-CHANNEL BASE FRAME	*	1	X	
8	IPR-GROUND PLATE A(OPC)	JC70-00240A	1	O	
9	IPR-GROUND PLATE B(BASE)	JC70-00241A	1	O	
10	PMO-BASE FRAME	JC72-00779A	1	O	
11	PMO-BRACKET PUSH DEVE	*	2	X	
12	PMO-BRACKET SIDE OPEN	JC72-00781A	1	O	
13	PMO-COVER FRONT DUMMY	JC72-00785A	1	O	
14	ELA M/M-AUD SPEAKER	JC96-01607A	1	O	
15	SPRING ETC-DEVE REAR	*	1	X	
16	CBF HARNESS-OPC GND	*	1	X	
17	FAN-DC(LSU)	JC31-00026A	1	O	
18	SPRING ETC-DEVE FRONT	*	1	X	
19	SHEET-BASE FRAME	*	2	X	
20	SCREW-TAPPING	*	2	X	

O : Service available X : Service not available

5-10.Pick-up Ass'y Exploded View & Parts List

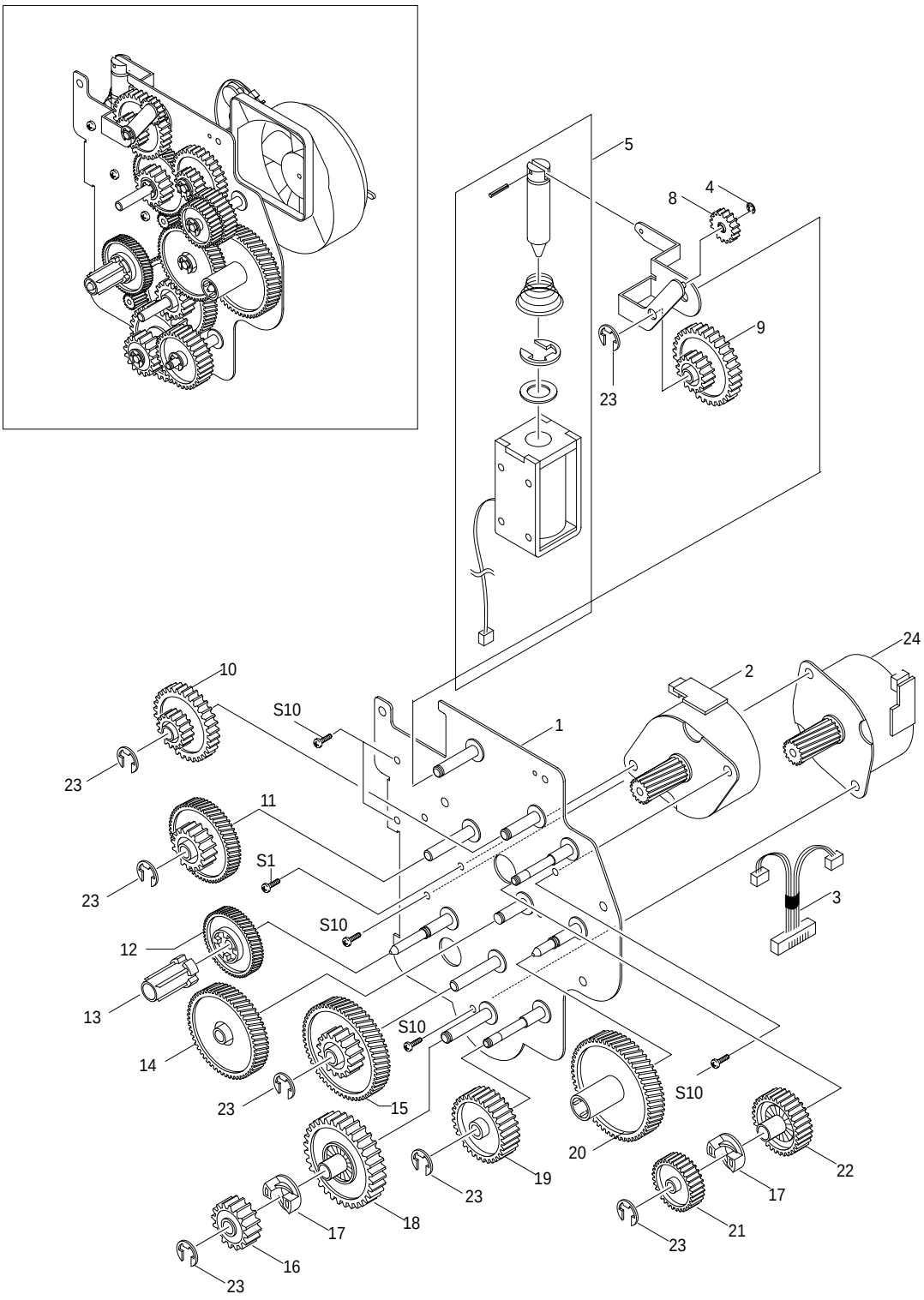


Pick-up Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-PICKUP PLUS ASS'Y	JC96-02715B	1	O	
1	IPR-GND FEED	*	1	X	
2	IPR-GND INPUT	JC70-00235A	1	O	
3	IPR-GUIDE INPUT	JC70-00222A	1	O	
4	PMO-ACTUATOR NO PAPER	*	1	X	
5	PBA SUB-TONER_TX	JC92-01359A	1	O	
6	PBA SUB-PTL	JC92-01361A	1	O	
7	PMO-FEED SENSOR	*	1	X	
8	PMO-GUIDE PAPER	JC72-00722A	1	O	
9	PMO-HOLDER SENSOR FEED	*	1	X	
10	PMO-LENS TONER SENSOR	*	1	X	
11	PMO-PTL PATH	*	1	X	
12	PBA SUB-FEED+P.EMP SEN.	JC92-01363A	1	O	
13	PMO-BUSHING_P/U,MP	JC72-41364A	1	O	
14	HOUSING-PICKUP LARGE	*	1	X	
15	HOUSING-PICKUP SMALL	*	1	X	
16	RPR RUBBER PICKUP	*	1	X	
17	RUBBER PICKUP SMALL	JC73-00163A	1	O	
18	SHAFT-PICKUP CST	*	1	X	
19	SHAFT PIN ADF	*	1	X	
20	SHEET-PTL PATH	*	1	X	
21	SHAFT-SUB-PICKUP	*	1	X	
22	RING-E ID4	6044-000125	4	O	
23	RING-E ID5	6044-000231	2	O	
24	PMO-BEARING SHAFT	JC72-41191A	1	O	
S	SCREW-TAPTITE	*	1	X	

O : Service available X : Service not available

5-11. Drive Ass'y Exploded View & Parts List

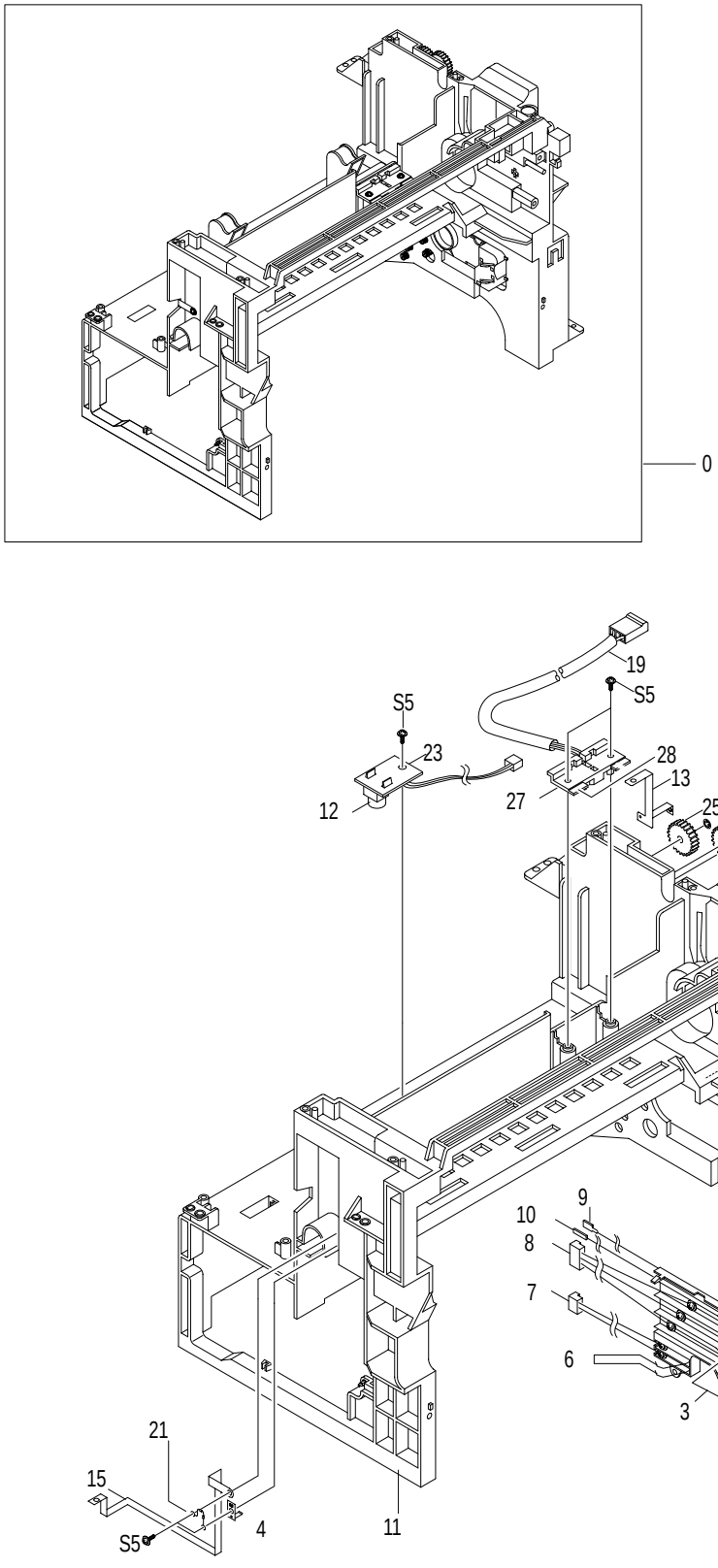


Drive Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-DRIVE(15PPM)	JC96-02741A	1	O	
1	IPR-BRKT MOTOR	*	1	X	
2	MOTOR STEP-MAIN	JC31-00020B	2	O	M49SP-2K
3	CBF HARNESS-MOTOR	JC39-00165A	1	O	
4	RING-C	6044-000159	1	O	
5	SOLENOID-DUPLEX	JC33-00008A	1	O	
6	SPRING ETC-SOLENOID DP	*	1	X	
7	IPR-LINK SOLENOID	*	1	X	
8	GEAR-EXIT/U,ID	JC66-40211B	1	O	
9	GEAR-SWING DRV	*	1	X	
10	GEAR-35/19	*	1	X	
11	GEAR-71/23	*	1	X	
12	GEAR-DEVE DRV	*	1	X	
13	PMO-DEV/COUPLING	*	1	X	
14	GEAR-RDCN,OPC	*	1	X	
15	GEAR-86/23	*	1	X	
16	GEAR-RDCN FEED OUTER	*	1	X	
17	GEAR-HUB CLUTCH	*	2	X	
18	GEAR-RDCN FEED INNER	*	1	X	
19	GEAR-FEED DRV	*	1	X	
20	GEAR-OPC DRV	*	1	X	
21	GEAR-GEAR FUSER DRV OUTER	*	1	X	
22	GEAR-FUSER DRV INNER	*	1	X	
23	RING-E	6044-000231	7	O	
24	MOTOR STEP-MAIN	JC31-00028B	1	O	M4PSP-2NK

O : Service available X : Service not available

5-12. Main Frame Ass'y Exploded View & Parts List

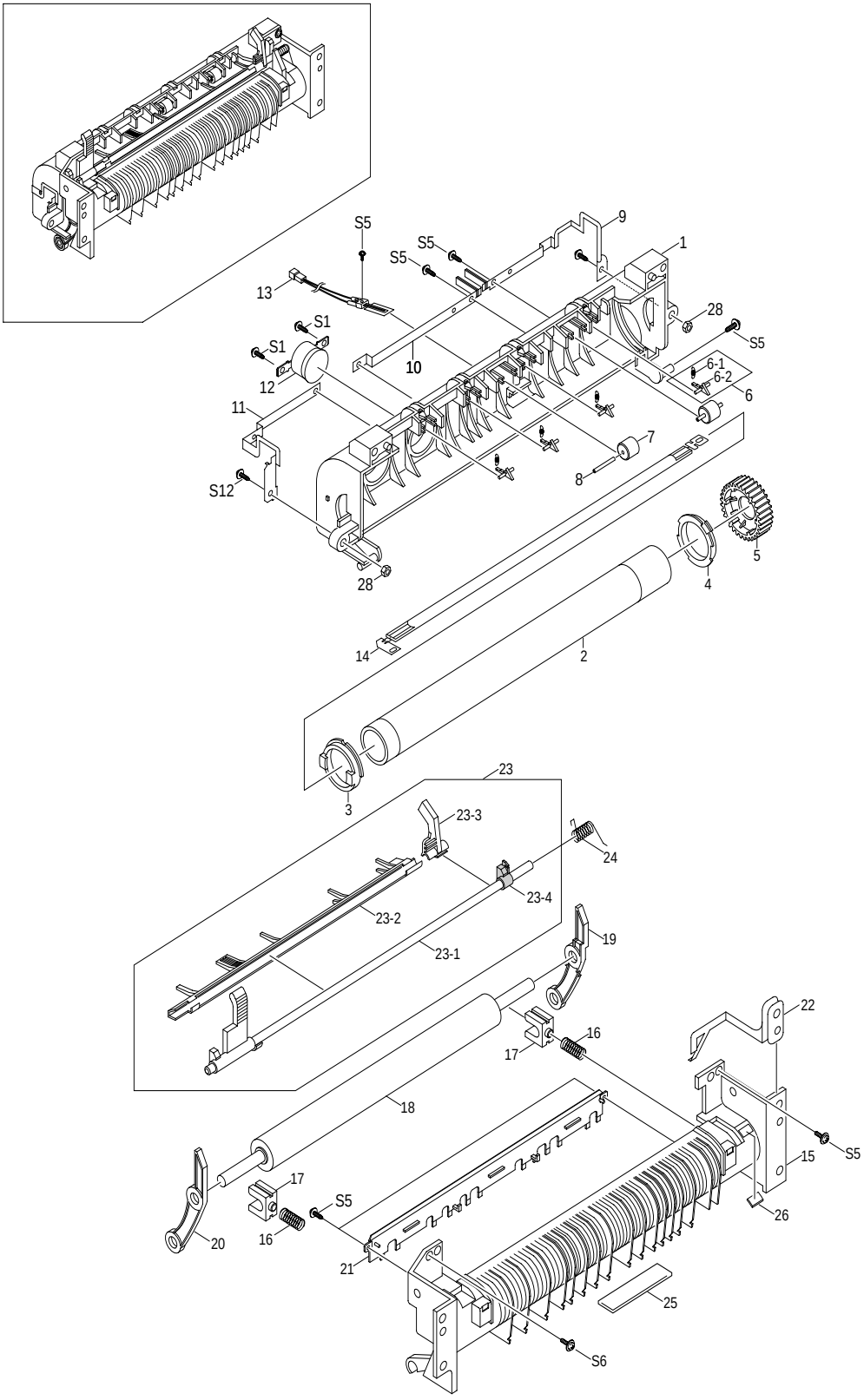


Main Frame Ass'y Parts List

NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-FRAME MAIN ASS'Y	JC96-02184A	1	O	
1	PMO-HOUSING TERMINAL	JC72-00802A	1	O	
2	IPR-TERMINAL BLADE	*	2	X	
3	IPR-TERMINAL SUPPLY	*	2	X	
4	IPR-TERMINAL TR	JC70-00271A	1	O	
5	IPR-TERMINAL GND	JC70-00272A	1	O	
6	IPR-TERMINAL DEVE KEY	*	2	X	
7	CBF-HARNESS-DEV-ID	*	1	X	
8	CBF-HARNESS-BLADE+SUPPLY+DEV	*	5	X	
9	CBF-HARNESS-THV WIRE	*	1	X	
10	CBF-HARNESS-MHV WIRE	*	1	X	
11	PMO-FRAME MAIN	JC72-00800A	1	O	
12	PMO-LENS TONER SENSOR	JC72-00803A	2	O	
13	IPR-GND EXIT	*	1	X	
14	IPR-GND OPC	*	1	X	
15	IPR-GND OPC BASE	*	1	X	
16	IPR-GND FUSER	*	1	X	
17	IPR-GUARD C/O S/W	*	1	X	
18	IPR-GND TERMINAL	*	1	X	
19	CBF HARNESS-AC WIRE	*	1	X	
20	AS-SWITCH MICRO(FRU)	JC81-00438A	1	O	
21	CBF-HARNESS-EARTH(TX MOTOR)	*	1	X	
22	PBA SUB-EXIT SENSOR	JC92-01364A	1	O	
23	PBA SUB-TONER_RX	JC92-01360A	1	O	
24	GEAR-EXIT/U,ID	JC66-40211B	3	O	
25	GEAR-EXIT,IDLE(Z17)	JC66-40964A	2	O	
26	CBF-HARNESS THERMISTOR_JOINT	JC39-00164A	1	O	
27	PMO-HOUSING TERMINAL	JC72-41010A	1	O	
28	IPR-TERMINAL FU	JC70-10961A	2	O	
29	PMO-CAP CONNECTOR L	JC72-00463A	1	O	
30	PMO-CAP CONNECTOR U	JC72-00465A	1	O	
31	ELA HOU-MOTOR GND	*	1	X	
32	SPRING-CLUTCH	JB61-70922A	2	O	
33	RING-CS	6044-000001	5	O	

O : Service available X : Service not available

5-13. FuserAss'y Exploded View & Parts List

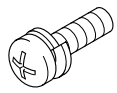
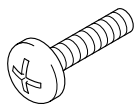
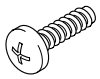
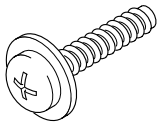
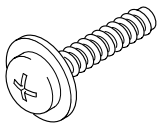
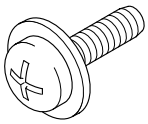
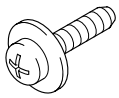
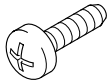
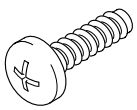
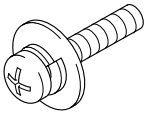


Fuser Ass'y Parts List

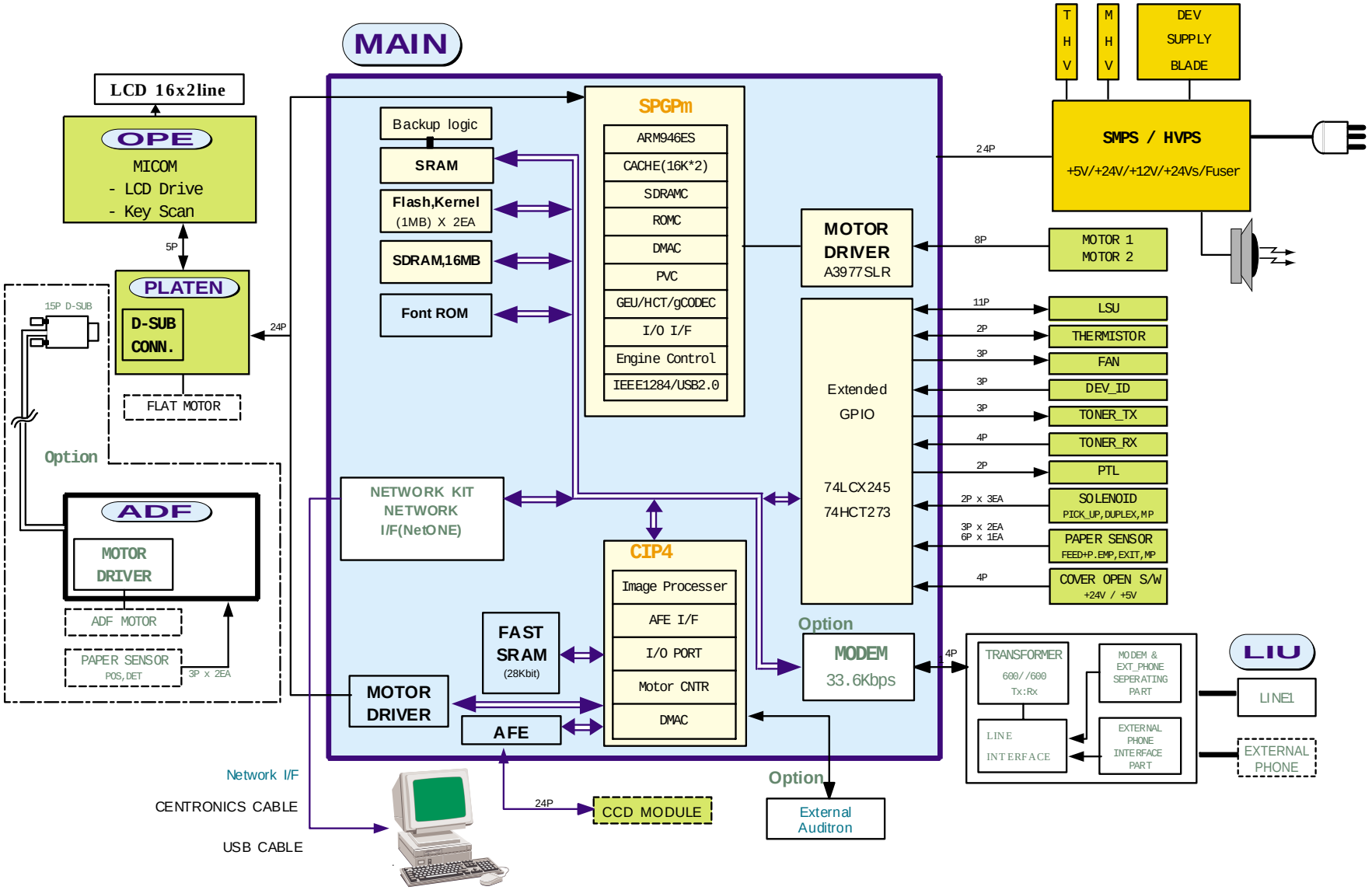
NO	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
0	ELA HOU-FUSER	JC96-02814A	1	O	110V
	ELA HOU-FUSER	JC96-02815A	1	O	220V
1	PMO-UPPER FUSER	JC72-00812A	1	O	
2	ROLLER-HEAT	*	1	X	
3	PMO-BEARING H/R-F	JC72-00814A	1	O	
4	BEARING-H/R L	JC66-10902A	1	O	
5	GEAR-FUSER	JC66-40913B	1	O	110V
	GEAR-FUSER	JC66-00669A	1	O	
6	MEA UNIT-CLAW ASS'Y	JC97-01587A	4	O	
6-1	SPRING ETC-SAPERATION	JC61-70909A	1	O	
6-2	PMO-GUIDE CLAW	*	1	X	
7	PEX-ROLLER EXIT F_UP	JC72-20901A	2	O	
8	IPR-PIN ROLLER EXIT	*	2	X	
9	NPR-ELECTRODE GEAR	JC71-00029A	1	O	
10	NPR-ELECTRODE M	JC71-00030A	1	O	
11	NPR-ELECTRODE F	JC71-00028A	1	O	
12	THERMOSTAT	4712-000001	1	O	
13	THERMISTOR	JC14-00001A	1	O	
14	LAMP-HALOGEN	4713-001170	1	O	110V
14	LAMP-HALOGEN	4713-001171	1	O	220V
15	PMO-LOWER FUSER	JC72-00820A	1	O	
16	SPRING ETC-PR(7300)	JC61-00056A	2	O	
17	BEARING-PRESSURE/R	JC66-10901A	2	O	
18	ROLLER-PRESSURE	*	1	X	
19	PMO-LEVER JAM R	JC72-01262A	1	O	
20	PMO-LEVER JAM F	JC72-01259A	1	O	
21	PMO-GUIDE INPUT	JC72-00817A	1	O	
22	IPR-GROUND FU	JC70-00259A	1	O	
23	MEA UNIT-ACTUATOR ASS'Y	JC97-01611A	1	O	
23-1	PMO-ACTUATOR EXIT	JC72-00810A	1	O	
23-2	PMO-GUIDE DUPLEX	JC72-00816A	1	O	
23-3	PMO-ARM ACTUATOR	JC72-00811A	1	O	
23-4	GUIDE-REMOVE	*	1	X	
24	SPRING ETC-ACTUATOR6G	JC61-00485A	1	O	
25	LABEL(R)-CAU_HOT_FU	*	1	X	
26	LABEL(R)-HV FUSER	*	1	X	
27	LABEL FUSER M+	*	1	X	
28	NUT-HEXAON	*	2	X	

O : Service available X : Service not available

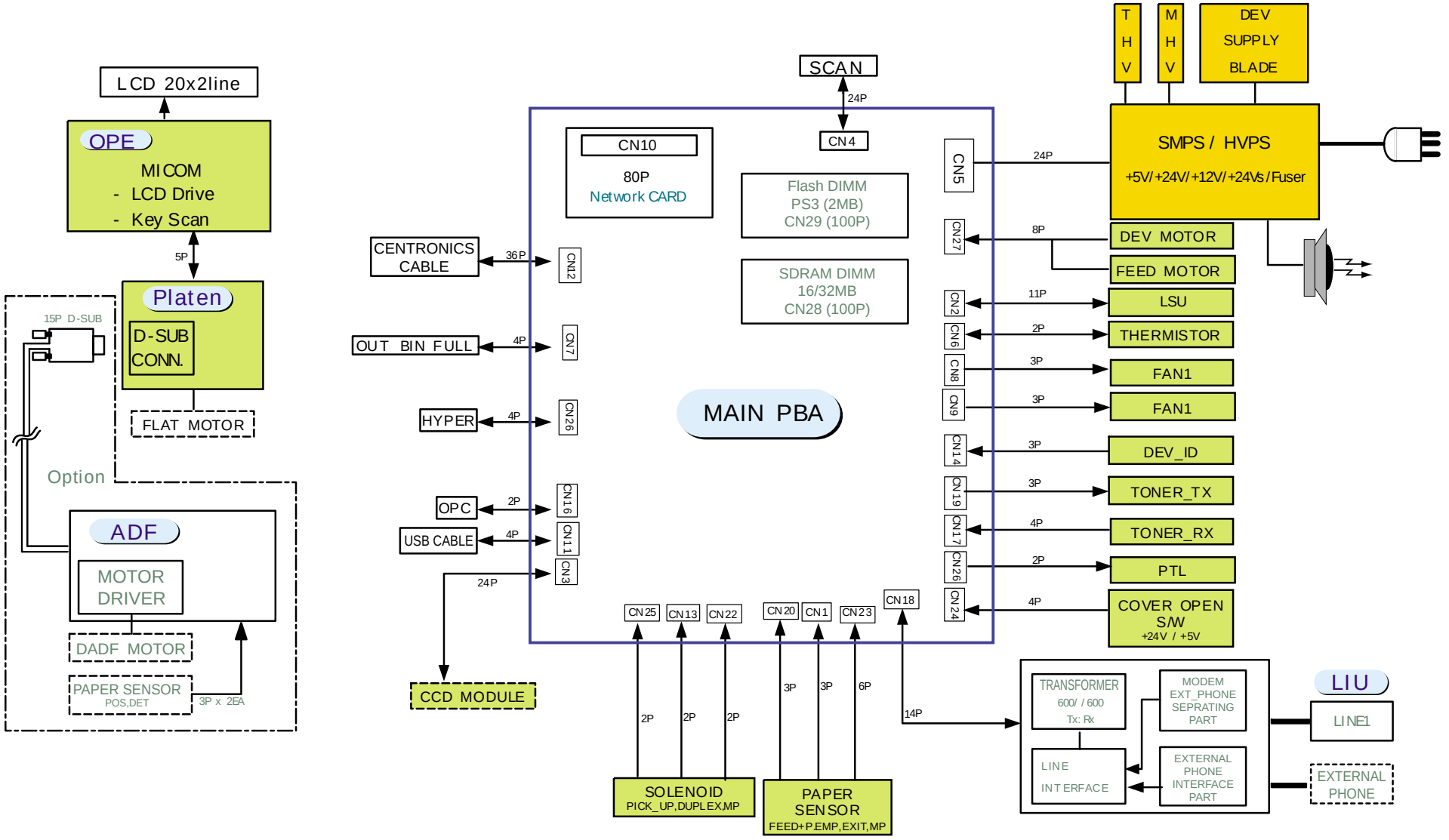
5-14. Screw

NO	SEC CODE	DESCRIPTION	SPEC.	
S1	6006-000127	SCREW-ASS'Y MACH	WS,PH,+,M3,L6,ZPC(YEL),MSWR15	
S2	6001-000568	SCREW-MACHINE	PH,+,M3,L8,NI PLT,SM20C,-	
S3	6002-000175	SCREW-TAPPING	PWH,+,2,M3,L8,ZPC(YEL),SM20C	
S4	6002-000351	SCREW-TAPPING	PH,+,2,M2,L8,ZPC(YEL),SM20C	
S5	6003-000119	SCREW-TAPTITE	BH,+,B,M3,L8,CBLACK,SWRCH18A	
S6	6003-000196	SCREW-TAPTITE	PWH,+,B,M3,L10,NI PLT,SWRCH18A	
S7	6003-000198	SCREW-TAPTITE	PWH,+,B,M3,L12,ZPC(YEL),SWRCH1	
S8	6003-000221	SCREW-TAPTITE	PWH,+,S,M4,L8,ZPC(YEL),SWRCH18	
S9	6003-000266	SCREW-TAPTITE	PWH,+,S,M3,L6,ZPC(YEL),SWRCH18	
S10	6003-000269	SCREW-TAPTITE	BH,+,S,M3,L6,ZPC(YEL),SWRCH18A	
S11	6003-001256	SCREW-TAPTITE	BH,+,B,M4,L10,NI PLT,SWRCH18A	
S12	6006-001031	SCREW-ASS'Y MACH	WSP,PH,+,M3,ZPC(YEL),SM10C	

6. Block Diagrams



7. Connection Diagrams



CON No.	Pin No.	Description
CN1 EXIT	1	5VCC
	2	EXIT SENSOR
	3	GND

CON No.	Pin No.	Description
CN2 LSU	1	HSYNC*
	2	5VS
	3	GND
	4	LD_ON*
	5	VDO*
	6	NC
	7	LSU_CLK
	8	LREADY*
	9	PMOTOR
	10	GND
	11	24VS1

CON No.	Pin No.	Description
CN3 CCD MODULE	1	GND
	2	CCD_VOB
	3	GND
	4	CCD_VOR
	5	GND
	6	CCD_VOG
	7	GND
	8	GND
	9	CCD_PI_TG1
	10	CCD_PI_TG1
	11	CCD_PI_TG1
	12	GND
	13	CCD_PI_RS
	14	CCD_PI2
	15	CCD_PI1
	16	GND
	17	GND
	18	CCD_PI_CP
	19	5V
	20	GND
	21	CCD_HOME
	22	24V
	23	INV_POWER
	24	GND

CON No.	Pin No.	Description
CN4 SCAN	1	GND
	2	24V
	3	5V
	4	GND
	5	ADF_PHA
	6	GND
	7	SCAN_ADF_IA(1)
	8	SCAN_ADF_IA(0)
	9	SCAN_ADF_IB(0)
	10	ADF_PHB
	11	MODULE_DETECT
	12	SCAN_ADF_IB(1)
	13	ADF_P_POS
	14	ADF_P_DET
	15	NC
	16	ADF_P_REGI
	17	OPE_RXD
	18	OPE_RST
	19	OPE_TXD
	20	FLAT_COVER
	21	TM_A
	22	TM_NA
	23	TM_B
	24	TM_NB

CON No.	Pin No.	Description
CN5 PWR/ HVPS	1	GND
	2	5V
	3	GND
	4	5V
	5	GND
	6	5V
	7	GND
	8	12V
	9	GND
	10	24V
	11	GND
	12	24V
	13	GND
	14	24V
	15	THV_PWM
	16	+24VS1
	17	THV_EN
	18	+24VS1
	19	THVREAD
	20	FUSER_ON
	21	MHV_PWM
	22	SPK+
	23	DEV_PWM
	24	SPK-

CON No.	Pin No.	Description
CN6 THERMISTER	1	THERM
	2	THERM

CON No.	Pin No.	Description
CN7 OUT_BIN_FULL	1	5V
	2	OUTBIN_FULL*
	3	GND

CON No.	Pin No.	Description
CN8 FAN	1	24V
	2	FAN

CON No.	Pin No.	Description
CN9 FAN	1	24V
	2	FAN

CON No.	Pin No.	Description
CN10	80P	NPC

CON No.	Pin No.	Description
CN11	6P	USB PORT

CON No.	Pin No.	Description
CN12	36P	PARALLEL PORT

CON No.	Pin No.	Description
CN13 DUPLEX_SOL	1	24V
	2	DUPLEX_SOL

CON No.	Pin No.	Description
CN14 DEV_ID	1	DEV_ID
	2	GND
	3	GND

CON No.	Pin No.	Description
CN16 OPC	1	NEW_OPC
	2	GND

CON No.	Pin No.	Description
CN17 TONER_ RX	1	NC
	2	TONER_RX
	3	GND
	4	NC

CON No.	Pin No.	Description
CN18 LIU	1	MODEM_RX
	2	GND
	3	MODEM_TXA1
	4	MODEM_TXA2
	5	12V
	6	REMOTE
	7	CML1
	8	HOOK2*
	9	RING_DET*
	10	5V
	11	DP
	12	GND
	13	RECALL
	14	E_DP*

CON No.	Pin No.	Description
CN19 TONER_ TX	1	5V
	2	TONER_TX
	3	NC

CON No.	Pin No.	Description
CN20 FEED/ PEMPTY	1	5V
	2	FEED*
	3	GND
	4	5V
	5	PEMPTY
	6	GND

CON No.	Pin No.	Description
CN21 PTL	1	5V
	2	PTL

CON No.	Pin No.	Description
CN22 MP_SOL	1	24V
	2	MP_SOL

CON No.	Pin No.	Description
CN23 MP_EMP TY	1	5V
	2	MP_EMPTY
	3	GND

CON No.	Pin No.	Description
CN24 COVER S/W	1	5V
	2	5VS
	3	24V
	4	24VS

CON No.	Pin No.	Description
CN25 PICK_UP_SOL	1	24V
	2	MAIN_SOL

CON No.	Pin No.	Description
CN26 HYPER I/F	1	5V
	2	HYPER_TXD
	3	HYPER_RXD
	4	GND

CON No.	Pin No.	Description
CN27 FUSER, FEED MOTOR	1	FEED MOTOR B
	2	FEED MOTOR A
	3	FEED MOTOR B*
	4	FEED MOTOR A*
	5	FUSER MOTOR A
	6	FUSER MOTOR B
	7	FUSER MOTOR B*
	8	FUSER MOTOR A*

Memo

Repair Manual

Digital Laser MFP

SCX-5315F/SCX-5115

CONTENTS

1. Block Diagram
2. Connection Diagram
3. Circuit Description
4. Schematic Diagrams

SAMSUNG

This manual is made and described centering around circuit diagram and circuit description needed in the repair center in the form of appendix.

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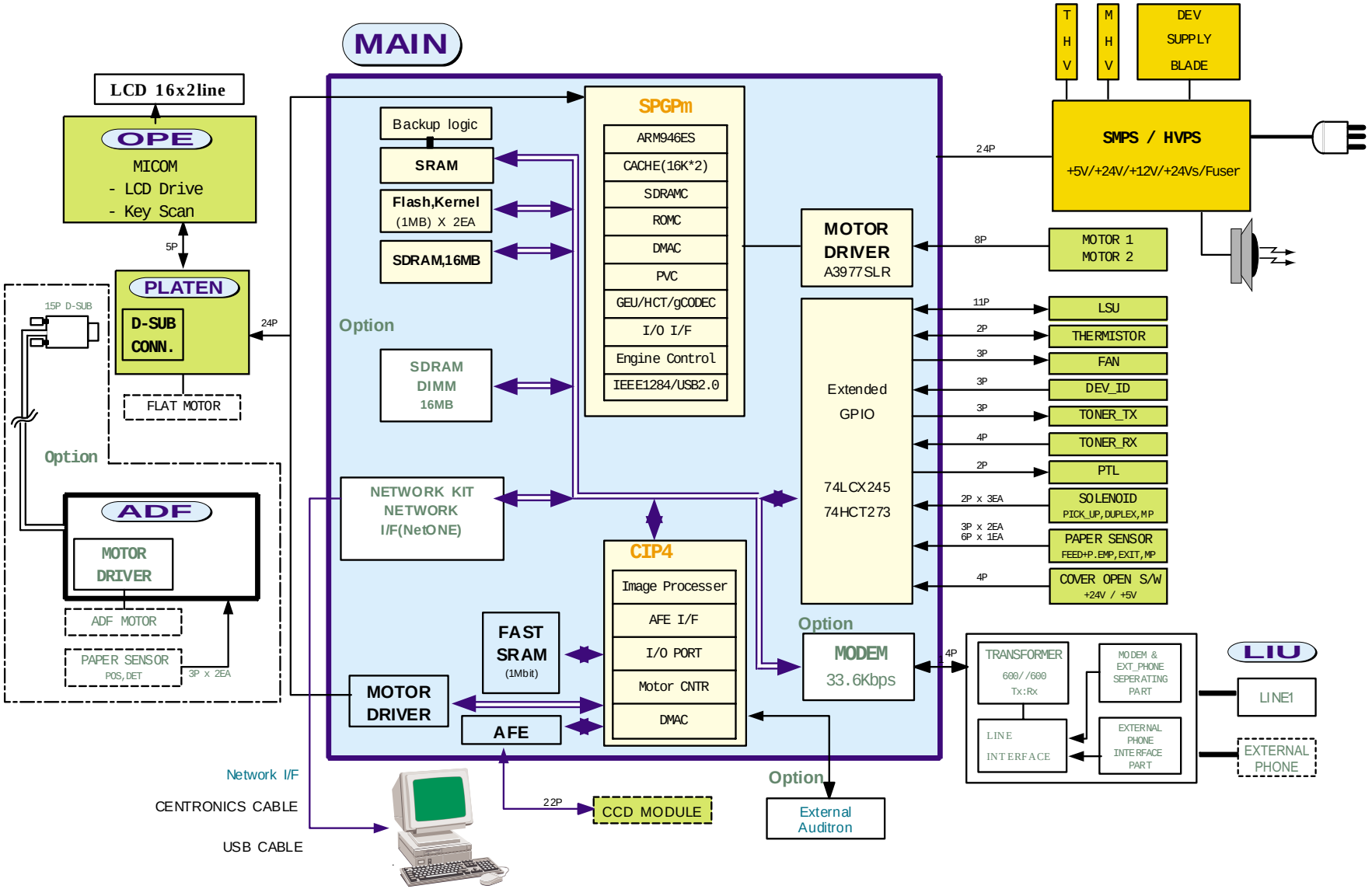
1. Block Diagrams



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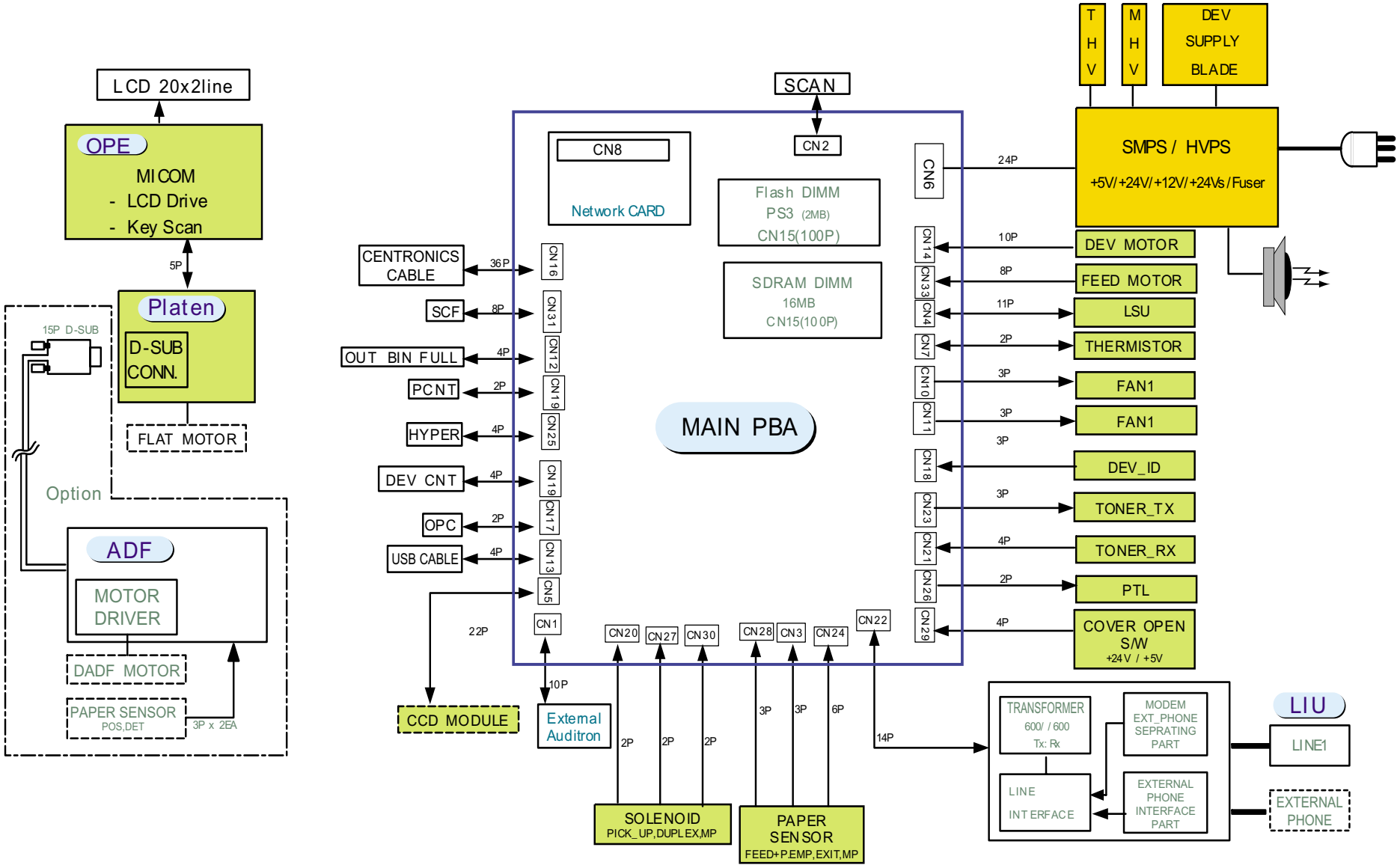
2. Connection Diagrams



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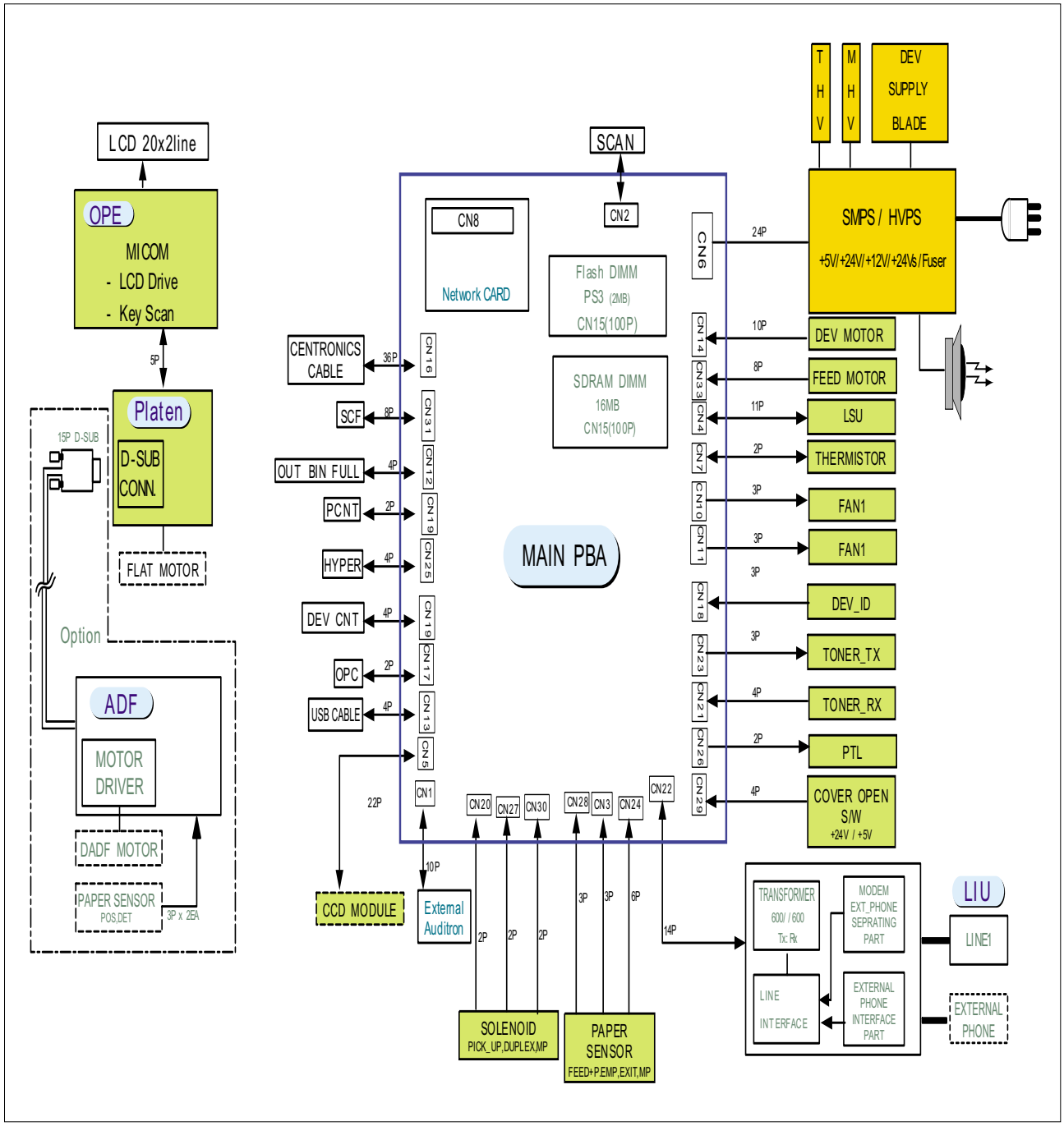
3. Circuit Description

3-1 Main PBA

3-1-1 Summary

The main circuit that consists of CPU, MFP controller (built-in 32bit RISC processor core: ARM946ES) including various I/O device drivers, system memory, scanner, printer, motor driver, PC I/F, and FAX transceiver controls the whole system. The entire structure of the main circuit is as follows :



<Block Diagram>

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3-2 Circuit Operation

3-2-1 Clock

1) System Clock

Device	Oscillator
Frequency	12MHz

• ARM946ES RISC PROCESSOR: drives PLL internally uses 120MHz and external Bus uses 60 MHz.

2) Video Clock

Device	Oscillator
Frequency	57.0167MHz

• Fvd =((PAPER 1SCAN LINE sending time * SCAN effective late /1SCAN LINE DOT #)*4
=(600dpi*600dpi*58.208mm/s*216mm*4)/(25.4mm*25.4mm*76.1%)=28.697MHz
•PAPER 1SCAN LINE sending time=SCAN LINE interval/DOCUMENT SPEED (58.208mm/S)
•1SCAN LINE DOT #=MAZ SCAN distance(216mm)*DOT# per 1mm

3)USB Clock

Device	Oscillator
Frequency	48MHz

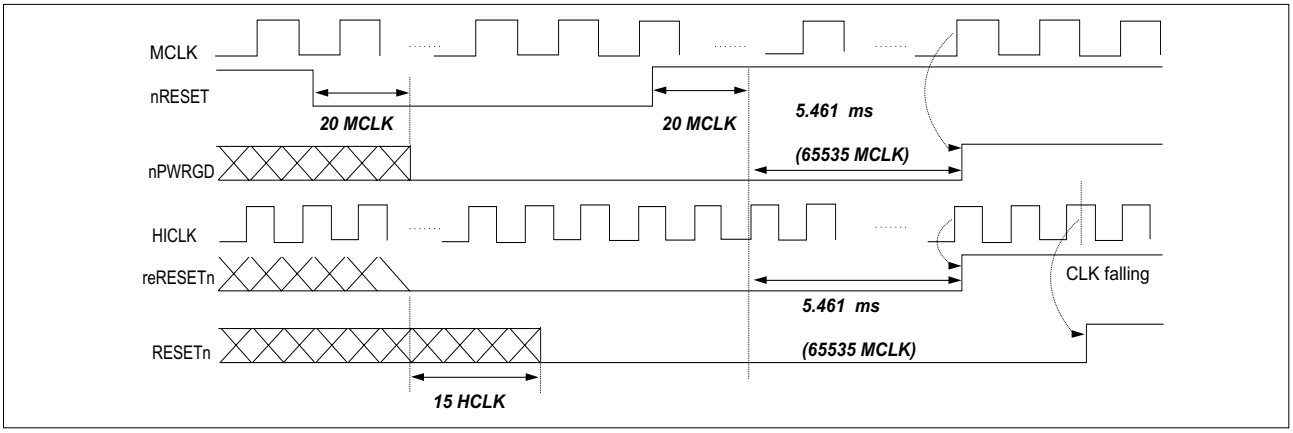
3-2-2 POWER ON/OFF RESET

1) Signal Operation

Input Signal +3.3V Power Line (VCC)
Output Signal ARM946ES nRESET and 29LU16ø
• POWER ON/OFF DETECT VCC RISING/FALLING 4.5°≠4.6V

RESET TIME (Td) 1.48~1.52ms
• Td=(Ct*V sensing)/I charge (...Ct=33µF, Is=100µA)

2) TIMING CHART



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3-2-3 RISC MICROPROCESSOR

1) RISC MICROCESSOR PIN & INTERFACE(SPGPm)

Ball No	Pin No	Pin Name	I/O	Description	PAD
B1	1	SD15	I/O	SDRAM Bus Data[15]	BD8TARP_TC
C2	2	VSS_PLL1	-	VSS for Core PLL	-
D2	3	VDD_PLL1	-	VDD for Core PLL (1.8V)	-
D3	4	DATA0 / GPI1	I/O	ROM Bus Data[0] / GPI[1]	BD8TRP_FT
E4	5	MCLK	I	Core PLL Clock Input (12MHz)	TLCHT_TC
C1	6	DATA6 / GPI7	I/O	ROM Bus Data[6] / GPI[7]	BD8TRP_FT
D1	7	DATA1 / GPI2	I/O	ROM Bus Data[1] / GPI[2]	BD8TRP_FT
E3	8	DATA5 / GPI6	I/O	ROM Bus Data[5] / GPI[6]	BD8TRP_FT
E2	9	VDD_RING_OSC	-	VDD for Ring Oscillator (1.8V)	-
E1	10	DATA3 / GPI4	I/O	ROM Bus Data[3] / GPI[4]	BD8TRP_FT
F3	11	DATA9 / GPI10	I/O	ROM Bus Data[9] / GPI[10]	BD8TRP_FT
G4	12	GND	-	GROUND_RING	-
F2	13	DATA8 / GPI9	I/O	ROM Bus Data[8] / GPI[9]	BD8TRP_FT
F1	14	DATA7 / GPI8	I/O	ROM Bus Data[7] / GPI[8]	BD8TRP_FT
G3	15	DATA12 / GPI13	I/O	ROM Bus Data[12] / GPI[13]	BD8TRP_FT
G2	16	DATA11 / GPI12	I/O	ROM Bus Data[11] / GPI[12]	BD8TRP_FT
G1	17	DATA10 / GPI11	I/O	ROM Bus Data[10] / GPI[11]	BD8TRP_FT
H3	18	DATA4 / GPI5	I/O	ROM Bus Data[4] / GPI[5]	BD8TRP_FT
H2	19	DATA15 / GPI16	I/O	ROM Bus Data[15] / GPI[16]	BD8TRP_FT
H1	20	DATA14 / GPI15	I/O	ROM Bus Data[14] / GPI[15]	BD8TRP_FT
J4	21	VDD_CORE	-	VDD for CORE (1.8V)	-
J3	22	DATA19	I/O	ROM Bus Data[19]	BD8TRP_FT
J2	23	DATA18	I/O	ROM Bus Data[18]	BD8TRP_FT
J1	24	DATA17	I/O	ROM Bus Data[17]	BD8TRP_FT
K2	25	DATA16	I/O	ROM Bus Data[16]	BD8TRP_FT
K3	26	DATA22	I/O	ROM Bus Data[22]	BD8TRP_FT
K1	27	DATA13 / GPI14	I/O	ROM Bus Data[14] / GPI[14]	BD8TRP_FT
L1	28	DATA20	I/O	ROM Bus Data[20]	BD8TRP_FT
L2	29	DATA21	I/O	ROM Bus Data[21]	BD8TRP_FT
L3	30	DATA25	I/O	ROM Bus Data[25]	BD8TRP_FT
L4	31	DATA26	I/O	ROM Bus Data[26]	BD8TRP_FT
M1	32	DATA23	I/O	ROM Bus Data[23]	BD8TRP_FT
M2	33	DATA24	I/O	ROM Bus Data[24]	BD8TRP_FT
M3	34	DATA29	I/O	ROM Bus Data[29]	BD8TRP_FT
M4	35	DATA30	I/O	ROM Bus Data[30]	BD8TRP_FT
N1	36	DATA27	I/O	ROM Bus Data[27]	BD8TRP_FT
N2	37	DATA28	I/O	ROM Bus Data[28]	BD8TRP_FT
N3	38	VDD_ARM	-	VDD for ARM	-
P1	39	DATA31	I/O	ROM Bus Data[31]	BD8TRP_FT
P2	40	DATA2 / GPI3	I/O	ROM Bus Data[2] / GPI[3]	BD8TRP_FT
R1	41	VDD_CORE	-	VDD for CORE (1.8V)	-
P3	42	nROMCS2	O	ROM Bank2 Select_n	B4TR_TC

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Ball No	Pin No	Pin Name	I/O	Description	PAD
R2	43	nRD	O	ROM Bus Read_n	B4TR_TC
T1	44	nROMCS0	O	ROM Bank0 Select_n	B4TR_TC
P4	45	nROMCS3 / nIOCS3 / GPO1	O	ROM Bank3 Select_n / IO Bank3 Select_n / GPO[1]	B4TR_TC
R3	46	nWR	O	ROM Bus Write_n	B4TR_TC
T2	47	nROMCS1	O	ROM Bank1 Select_n	B4TR_TC
U1	48	ADDR12	O	ROM Bus Addr[12]	B8TR_TC
T3	49	ADDR10	O	ROM Bus Addr[10]	B8TR_TC
U2	50	ADDR13	O	ROM Bus Addr[13]	B8TR_TC
V1	51	ADDR15	O	ROM Bus Addr[15]	B8TR_TC
T4	52	ADDR11	O	ROM Bus Addr[11]	B8TR_TC
U3	53	ADDR14	O	ROM Bus Addr[14]	B8TR_TC
V2	54	ADDR16	O	ROM Bus Addr[16]	B8TR_TC
W1	55	ADDR19	I/O	ROM Bus Addr[19]	BD8TRP_TC
V3	56	ADDR17	I/O	ROM Bus Addr[17]	BD8TRP_TC
W2	57	ADDR20	I/O	ROM Bus Addr[20]	BD8TRP_TC
Y1	58	nIOCS0	O	IO Bank0 Select_n	B4TR_TC
W3	59	ADDR21	I/O	ROM Bus Addr[21]	BD8TRP_TC
Y2	60	nIOCS1	O	IO Bank1 Select_n	B4TR_TC
W4	61	ADDR22	I/O	ROM Bus Addr[22]	BD8TRP_TC
V4	62	ADDR18	I/O	ROM Bus Addr[18]	BD8TRP_TC
U5	63	ADDR7	O	ROM Bus Addr[7]	B8TR_TC
Y3	64	VDD_CORE	O	VDD for CORE (1.8V)	-
Y4	65	nIOCS2 / nDACK0 / GPO2	O	IO Bank2 Select_n / DMA IO Bank0 ACK_n / GPO[2]	B4TR_TC
V5	66	ADDR1	O	ROM Bus Addr[1]	B8TR_TC
W5	67	ADDR8	O	ROM Bus Addr[8]	B8TR_TC
Y5	68	ADDR9	O	ROM Bus Addr[9]	B8TR_TC
V6	69	ADDR4	O	ROM Bus Addr[4]	B8TR_TC
U7	70	ADDR6	O	ROM Bus Addr[6]	B8TR_TC
W6	71	ADDR2	O	ROM Bus Addr[2]	B8TR_TC
Y6	72	ADDR3	O	ROM Bus Addr[3]	B8TR_TC
V7	73	ADDR5	O	ROM Bus Addr[5]	B8TR_TC
W7	74	VDD_ARM	-	VDD for ARM Hard Macro(1.8V)	-
Y7	75	VDD_CORE	-	VDD for CORE (1.8V)	-
V8	76	EINT0 / TnRST	I	Ext. Interrupt0 / TAP Controller Reset_n	SCHMITT_FT
W8	77	EINT1 / TCK	I	Ext. Interrupt1 / TAP Controller Clock	SCHMITT_FT
Y8	78	EINT2 / nRXD2 / TMS	I	Ext. Interrupt2 / UART RX DATA[2] / TAP Controller Mode Select	SCHMITT_FT
U9	79	EINT3 / nTXD2 / GPO9	I/O	Ext. Interrupt3 / UART TX Data[2] / GPO[9]	BD4STRP_FT
V9	80	nRxD0	I	UART RX Data[0]	SCHMITT_FT
W9	81	nRxD1 / GPI17 / TDI	I	UART RX Data[1] / GPI[17] / TAP Controller Data In	SCHMITT_FT
Y9	82	nTxD0	O	UART TX Data[0]	B4TR_TC
W10	83	TESTMODE	I	TESTMODE (Nomal : 0)	SCHMITT_TC

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Ball No	Pin No	Pin Name	I/O	Description	PAD
V10	84	nTxD1 / GPO10 / TDO	O	UART Tx Data[1] / GPO[10] / Tap Controller Data Out	B4TR_TC
Y10	85	TESTSE	I	TESTSE (Normal : 0)	SCHMITT_TC
Y11	86	VDD_CORE	-	VDD for CORE (1.8V)	-
W11	87	RXERR / GPI25	I	MAC RX Error / GPI[25]	SCHMITT_TC
V11	88	GND	-	GROUND_RING	-
U11	89	RX_DV / GPI20	O	MAC RX Data Valid / GPI[20]	SCHMITT_TC
Y12	90	RXD0 / GPI21	O	MAC RX Data[0] / GPI[21]	SCHMITT_TC
W12	91	nLFPHB1 / nPRINT	O	Motor Out B_n / Print Start_n	B4TR_TC
V12	92	nLFPHB0 / nCMSG	O	Motor Out B / Command Message_n	B4TR_TC
U12	93	nLFPHA0 / CCLK	O	Motor Out A / Communication Clock	B4TR_TC
Y13	94	RXD1 / GPI22	I	MAC RX Data[1] / GPI[22]	SCHMITT_TC
W13	95	VDO	O	Video Data Out	B8TR_TC
V13	96	SPD / nDREQ3	I/O	DIMM Detect / DMA REQ[3]_n	BD4SRTP_TC
Y14	97	nWAIT1 / CRS	I	Wait_n / MAC Carrier Sensor	SCHMITT_TC
W14	98	COL / EINT4	I	MAC Collision Detect / Ext. Interrupt4	SCHMITT_TC
Y15	99	TX_EN	O	MAC TX Enable	B4TR_TC
V14	100	MDIO	I/O	MAC Management Data Inout	BD4STRUQP_TC
W15	101	TXD3 / GPO14	O	MAC TX Data[3] / GPO[14]	B4TR_TC
Y16	102	TXD2 / GPO13	O	MAC TX Data[2] / GPO[13]	B4TR_TC
U14	103	MDC / GPO15	O	MAC Management Data Clock / GPO[15]	B4TR_TC
V15	104	TXCLK / GPI18	I	MAC TX Clock(25MHz) / GPI[18]	SCHMITT_TC
W16	105	TXD1 / GPO12	O	MAC TX Data[1] / GPO[12]	B4TR_TC
Y17	106	PD4	I/O	Parallel Port Data[4]	BD4STRP_FT
V16	107	TXD0 / nIOCS3	O	MAC TX Data[0] / IO Bank3 Select_n	B4TR_TC
W17	108	RXD3 / GPI24	I	MAC RX Data[3] / GPI[24]	SCHMITT_TC
Y18	109	PD2	I/O	Parallel Port Data[2]	BD4STRP_FT
U16	110	PD6	I/O	Parallel Port Data[6]	BD4STRP_FT
V17	111	RXD2	I	MAC RX Data[2] / GPI[23]	SCHMITT_TC
W18	112	PWMOUT2	O	PWM Output[2]	B4TR_TC
Y19	113	VCLK	I	Video Reference Clock	TLCHT_TC
V18	114	RXCLK / GPI19	I	MAC RX Clock(25MHz) / GPI[19]	SCHMITT_TC
W19	115	PD1	I/O	Parallel Port Data[1]	BD4STRP_FT
Y20	116	nINIT	I	Parallel Port Initialization_n	SCHMITT_FT
W20	117	VSS_ADC	-	VSS for ADC	-
V19	118	ATEST_OUT	O	ADC Test Output	ANA_TC
U19	119	AIN2	I	ADC Channel2 Input	ANA_TC
U18	120	AIN1	I	ADC Channel1 Input	ANA_TC
T17	121	AIN0	I	ADC Channel0 Input	ANA_TC
V20	122	VDD_ADC	-	Analog power for ADC (3.3V)	-
U20	123	VDD_CORE	-	VDD for CORE (1.8V)	-
T18	124	GND	-	GROUND_RING	-
T19	125	VDD_CORE	-	VDD for CORE (1.8V)	-

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Ball No	Pin No	Pin Name	I/O	Description	PAD
T20	126	VDD_CORE	-	VDD for CORE (1.8V)	-
R18	127	VBUS	I	USB Detect	SCHMITT_FT
P17	128	nLREADY / nEBSY	I	LSU Ready_n / Engine Busy_n	SCHMITT_FT
R19	129	nSELECTIN	I	Parallel Port Select Input_n	SCHMITT_FT
R20	130	LSUCLK / nCBSY / GPO11	O	LSU Clock / Command Busy_n / GPO[11]	B4TR_TC
P18	131	PD7	I/O	Parallel Port Data[7]	BD4STRP_FT
P19	132	PWMOUT1	O	PWM Output[1]	B4TR_TC
P20	133	PWMOUT0	O	PWM Output[0]	B4TR_TC
N18	134	nEMSG / nDACK3 / PWMOUT3	I/O	Engine Message_n / DMA ACK[3]_n / PWM Output[3]	BD4STRP_FT
N19	135	nFSYNC / nLFPHA1	I/O	Frame Sync_n / Motor Out A_n	BD4STRP_FT
N20	136	nHSYNC	I	Line Sync_n	SCHMITT_FT
M17	137	nSTROBE	I	Parallel Port Data Strobe_n	SCHMITT_FT
M18	138	PD5	I/O	Parallel Port Data[5]	BD4STRP_FT
M19	139	nWAIT0 / PDE	I/O	Wait_n / Parallel Port Data Enable	BD4STRP_TC
M20	140	nIOCS5 / nSCS4 / GPO3 / TONEOUT	O	DRAM Bank4 / IO Bank5 Select_n / GPO[3] / Tone Pulse Out	BD8TARP_TC
L19	141	PD3	I/O	Parallel Port Data[3]	BD4STRP_FT
L18	142	nFAULT	O	Parallel Port Fault_n	B4TR_TC
L20	143	nDREQ0 / GPI0 / ADDR23	I/O	DMA REQ[0]_n / GPI[0] / ADDR[23]	BD4STRP_TC
K20	144	nRESET	I	External Reset_n Input	SCHMITT_TC
K19	145	PERROR	O	Parallel Port Paper Error	B4TR_TC
K18	146	nAUTOFD	I	Parallel Port Auto Feed_n	SCHMITT_FT
K17	147	nDACK2 / DQM7 / GPO5	O	DMA ACK[2]_n / DQM[7] / GPO[5]	BD8TARP_TC
J20	148	nDREQ2 / DQM6 / GPO6	I/O	DMA REQ[2]_n / DQM[6] / GPO[6]	BD8TARP_TC
J19	149	nDREQ1 / DQM4 / GPO8	I/O	DMA REQ[1]_n / DQM[4] / GPO[8]	BD8TARP_TC
J18	150	VDD_CORE	-	VDD for CORE (1.8V)	-
J17	151	nSCS0	O	SDRAM Bank0 Select_n	BD8TARP_TC
H20	152	nSCS2	O	SDRAM Bank2 Select_n	BD8TARP_TC
H19	153	nCAS	O	SDRAM Column Address Select_n	BD8TARP_TC
H18	154	nSCS1	O	SDRAM Bank1 Select_n	BD8TARP_TC
G20	155	nIOCS4 / nSCS3 / GPO4	O	IO Bank4 / SDRAM Bank3 Select_n / GPO[4]	BD8TARP_TC
G19	156	BUSY	O	Parallel Port Busy	B4TR_TC
F20	157	PD0	I/O	Parallel Port Data[0]	BD4STRP_FT
G18	158	SLCT_OUT	O	Parallel Port Selection Out	B4TR_TC
F19	159	nACK	O	Parallel Port Acknowledge_n	B4TR_TC
E20	160	nDACK1 / DQM5 / GPO7	O	DMA ACK[1]_n / DQM[5] / GPO[7]	BD8TARP_TC
G17	161	nRSTOUT / CLKOUT / GPO0	O	Internal Reset_n Out / Internal System Clock Out / GPO[0]	B8TR_TC
F18	162	SA7	O	SDRAM Bus Addr[7]	BD8TARP_TC
E19	163	SA9	O	SDRAM Bus Addr[9]	BD8TARP_TC

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Ball No	Pin No	Pin Name	I/O	Description	PAD
D20	164	VDD_USB	-	VDD for USB Hard Macro (1.8V)	-
E18	165	SA10	O	SDRAM Bus Addr[10]	BD8TARP_TC
D19	166	SA12	O	SDRAM Bus Addr[120	BD8TARP_TC
C20	167	BA0	O	SDRAM Bus Bank Select Addr[0]	BD8TARP_TC
E17	168	nRAS	O	SDRAM Row Address Select_n	BD8TARP_TC
D18	169	DQM2	O	SDRAM Bus DQM[2]	BD8TARP_TC
C19	170	DQM1	O	SDRAM Bus DQM[1]	BD8TARP_TC
B20	171	BA1	O	SDRAM Bus Bank Select Addr[1]	BD8TARP_TC
C18	172	DQM0	O	SDRAM Bus DQM[0]	BD8TARP_TC
B19	173	DQM3	O	SDRAM Bus DQM[3]	BD8TARP_TC
A20	174	RREF	I/O	USB PHY Register Reference	ANA_FT
A19	175	VSSL	-	VSS for Deserialisation Flip flops	-
B18	176	VDDL	-	VDD for Deserialisation Flip flops (1.8V)	-
B17	177	VSSB	-	VSS for buffers	-
C17	178	DMNS	I/O	USB2 DATA-	ANA_FT
D16	179	DPLS	I/O	USB2 DATA+	ANA_FT
A18	180	VDD3_USB	-	VDD for USB1.1 FS compliance (3.3V)	-
A17	181	VSSC	-	VSS for DLL and Xor tree	-
C16	182	VDDC	-	VDD for DLL and Xor tree (1.8V)	-
B16	183	VDDB	-	VDD for buffers (1.8V)	-
A16	184	VDD_USB	-	VDD for USB Hard Macro (1.8V)	-
C15	185	UCLK	I	USB PLL Input Clock (12MHz)	TLCHT_TC
D14	186	VSS_PLL2	-	VSS for USB PLL	-
B15	187	VDD_PLL2	-	VSS for USB PLL (1.8V)	-
A15	188	SA11	O	SDRAM Bus Addr[11]	BD8TARP_TC
C14	189	SA6	O	SDRAM Bus Addr[6]	BD8TARP_TC
B14	190	SA5	O	SDRAM Bus Addr[5]	BD8TARP_TC
A14	191	SA8	O	SDRAM Bus Addr[8]	BD8TARP_TC
C13	192	SA3	O	SDRAM Bus Addr[3]	BD8TARP_TC
B13	193	SA2	O	SDRAM Bus Addr[2]	BD8TARP_TC
A13	194	SA4	O	SDRAM Bus Addr[4]	BD8TARP_TC
D12	195	SA0	O	SDRAM Bus Addr[0]	BD8TARP_TC
C12	196	SA1	O	SDRAM Bus Addr[1]	BD8TARP_TC
B12	197	CKE	O	SDRAM Clock Enable	BD8TARP_TC
A12	198	nWE	O	SDRAM Write Enable_n	BD8TARP_TC
B11	199	SD30	I/O	SDRAM Bus Data[30]	BD8TARP_TC
C11	200	SD31	I/O	SDRAM Bus Data[31]	BD8TARP_TC
A11	201	SD29	I/O	SDRAM Bus Data[29]	BD8TARP_TC
A10	202	SD25	I/O	SDRAM Bus Data[25]	BD8TARP_TC
B10	203	SD26	I/O	SDRAM Bus Data[26]	BD8TARP_TC
C10	204	SD27	I/O	SDRAM Bus Data[27]	BD8TARP_TC
D10	205	SD28	I/O	SDRAM Bus Data[28]	BD8TARP_TC
A9	206	SD21	I/O	SDRAM Bus Data[21]	BD8TARP_TC
B9	207	SD22	I/O	SDRAM Bus Data[22]	BD8TARP_TC

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Ball No	Pin No	Pin Name	I/O	Description	PAD
C9	208	SD23	I/O	SDRAM Bus Data[23]	BD8TARP_TC
D9	209	SD24	I/O	SDRAM Bus Data[24]	BD8TARP_TC
A8	210	SD18	I/O	SDRAM Bus Data[18]	BD8TARP_TC
B8	211	SDCLK0	O	SDRAM Clock Output0	BD8TARP_TC
C8	212	SD20	I/O	SDRAM Bus Data[20]	BD8TARP_TC
A7	213	SD14	I/O	SDRAM Bus Data[14]	BD8TARP_TC
B7	214	SD19	I/O	SDRAM Bus Data[19]	BD8TARP_TC
A6	215	SD11	I/O	SDRAM Bus Data[11]	BD8TARP_TC
C7	216	SD16	I/O	SDRAM Bus Data[16]	BD8TARP_TC
B6	217	SDCLK1	O	SDRAM Clock Output1	BD8TARP_TC
A5	218	SD12	I/O	SDRAM Bus Data[12]	BD8TARP_TC
D7	219	SD17	I/O	SDRAM Bus Data[17]	BD8TARP_TC
C6	220	SD13	I/O	SDRAM Bus Data[13]	BD8TARP_TC
B5	221	SD8	I/O	SDRAM Bus Data[8]	BD8TARP_TC
A4	222	SD5	I/O	SDRAM Bus Data[5]	BD8TARP_TC
C5	223	SD9	I/O	SDRAM Bus Data[9]	BD8TARP_TC
B4	224	SD6	I/O	SDRAM Bus Data[6]	BD8TARP_TC
A3	225	SD3	I/O	SDRAM Bus Data[3]	BD8TARP_TC
D5	226	SD10	I/O	SDRAM Bus Data[10]	BD8TARP_TC
C4	227	SD7	I/O	SDRAM Bus Data[7]	BD8TARP_TC
B3	228	SD4	I/O	SDRAM Bus Data[4]	BD8TARP_TC
B2	229	SD1	I/O	SDRAM Bus Data[1]	BD8TARP_TC
A2	230	SD0	I/O	SDRAM Bus Data[0]	BD8TARP_TC
C3	231	SD2	I/O	SDRAM Bus Data[2]	BD8TARP_TC

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2) RISC MICROCESSOR PIN & INTERFACE(CIP4)

No	Pin Name	I/O	Description	Pad Type	Current drive
1	GND2	P	Vss Supply	vss2i	-
2	NTEST	I	Nand Tree Test Mode Selection	pticd	-
3	TM	I	Global Test Mode Selection	pticd	-
4	TEST1	I	Test Mode Selection 1	pticd	-
5	GND17	P	Vss Supply	vss3op	-
6	TEST2	I	Test Mode Selection 2	pticd	-
7	XDACK1	I	DMA Acknowledge Signal 1	ptis	-
8	XDREQ1	O	DMA Request Signal 1	phob4	4mA
9	VDD1	P	Vdd Supply	vdd2i	-
10	XDACK2	I	DMA Acknowledge Signal 2	ptis	-
11	XDREQ2	O	DMA Request Signal 2	phob4	4mA
12	XDACK3	I	DMA Acknowledge Signal 3	ptis	-
13	XDREQ3	O	DMA Request Signal 3	phob4	4mA
14	nRESET	I	Global Reset	ptis	-
15	CLK_OUT	O	PLL Clock Out	phob12	12mA
16	GND3	P	Vss Supply	vss2i	-
17	XP	I	Clock Oscillation Input	phsoscm26	10~40MHz
18	XPOUT	O	Clock Oscillation Output	phsoscm26	10~40MHz
19	GNDD16	P	Vss Supply	vss2t_abb	-
20	FILTER*	O	PLL Filter Pump Out	poar50_abb	-
21	GND1	P	Vss Supply	vbb_abb	-
22	VDDA9,VDDD9	P	Vdd Supply	vdd2t_abb	-
23	GND24,GND33	P	Vss Supply	vss3t_abb	-
24	RTC_XO	O	RTC Clock Oscillation Output	poar50_abb	-
25	RTC_XI	I	RTC Clock Oscillation Input	piar50_abb	-
26	VDD8,VDD18	P	Vdd Supply	vdd3t_abb	-
27	IRQ	O	Interrupt Request Signal	phob4	4mA
28	nCS	I	CIP4 Chip Select	ptis	-
29	GND4	P	Vss Supply	vss2i	-
30	nRD	I	CIP4 CPU Read Control	ptis	-
31	nWR	I	CIP4 CPU Write Control	ptis	-
32	BA1	I	Bank Address Bus [1]	ptis	-
33	BA0	I	Bank Address Bus [0]	ptis	-
34	GND19	P	Vss Supply	vss3op	-
35	A5	I	CPU Address Bus [5]	ptis	-
36	A4	I	CPU Address Bus [4]	ptis	-
37	A3	I	CPU Address Bus [3]	ptis	-
38	VDD2	P	Vdd Supply	vdd2i	-
39	A2	I	CPU Address Bus [2]	ptis	-
40	A1	I	CPU Address Bus [1]	ptis	-
41	A0	I	CPU Address Bus [0]	ptis	-
42	GND5	P	Vss Supply	vss2i	-
43	D31	B	CPU Data Bus [31]	phbst8	8mA

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No	Pin Name	I/O	Description	Pad Type	Current drive
44	D30	B	CPU Data Bus [30]	phbst8	8mA
45	D29	B	CPU Data Bus [29]	phbst8	8mA
46	D28	B	CPU Data Bus [28]	phbst8	8mA
47	GND20	P	Vss Supply	vss3op	-
48	D27	B	CPU Data Bus [27]	phbst8	8mA
49	D26	B	CPU Data Bus [26]	phbst8	8mA
50	D25	B	CPU Data Bus [25]	phbst8	8mA
51	VDD11	P	Vdd Supply	vdd3op	-
52	D24	B	CPU Data Bus [24]	phbst8	8mA
53	D23	B	CPU Data Bus [23]	phbst8	8mA
54	D22	B	CPU Data Bus [22]	phbst8	8mA
55	D21	B	CPU Data Bus [21]	phbst8	8mA
56	GND6	P	Vss Supply	vss2i	-
57	D20	B	CPU Data Bus [20]	phbst8	8mA
58	D19	B	CPU Data Bus [19]	phbst8	8mA
59	D18	B	CPU Data Bus [18]	phbst8	8mA
60	GND21	P	Vss Supply	vss3op	-
61	D17	B	CPU Data Bus [17]	phbst8	8mA
62	D16	B	CPU Data Bus [16]	phbst8	8mA
63	D15	B	CPU Data Bus [15]	phbst8	8mA
64	D14	B	CPU Data Bus [14]	phbst8	8mA
65	VDD3	P	Vdd Supply	vdd2i	-
66	D13	B	CPU Data Bus [13]	phbst8	8mA
67	D12	B	CPU Data Bus [12]	phbst8	8mA
68	D11	B	CPU Data Bus [11]	phbst8	8mA
69	GND7	P	Vss Supply	vss2i	-
70	D10	B	CPU Data Bus [10]	phbst8	8mA
71	D9	B	CPU Data Bus [9]	phbst8	8mA
72	D8	B	CPU Data Bus [8]	phbst8	8mA
73	D7	B	CPU Data Bus [7]	phbst8	8mA
74	GND22	P	Vss Supply	vss3op	-
75	D6	B	CPU Data Bus [6]	phbst8	8mA
76	D5	B	CPU Data Bus [5]	phbst8	8mA
77	D4	B	CPU Data Bus [4]	phbst8	8mA
78	VDD12	P	Vdd Supply	vdd3op	-
79	D3	B	CPU Data Bus [3]	phbst8	8mA
80	D2	B	CPU Data Bus [2]	phbst8	8mA
81	D1	B	CPU Data Bus [1]	phbst8	8mA
82	D0	B	CPU Data Bus [0]	phbst8	8mA
83	GND8	P	Vss Supply	vss2i	-
84	TX_EN1	O	Motor Control Tx Enable 1	phob4	4mA
85	TX_EN2	O	Motor Control Tx Enable 2	phob4	4mA
86	TX_A	O	Motor Control Tx Channel A	phob4	4mA
87	TX_B	O	Motor Control Tx Channel B	phob4	4mA
88	GND23	P	Vss Supply	vss3op	-

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No	Pin Name	I/O	Description	Pad Type	Current drive
89	nTX_A	O	Motor Control Tx Channel A	phob4	4mA
90	nTX_B	O	Motor Control Tx Channel A	phob4	4mA
91	MOTOR_POL	I	Motor Polarity	ptis	4mA
92	VDD4	P	Vdd Supply	vdd2i	-
93	PItg1	O	CIS/CCD PItg1 Signal	phob8	8mA
94	PI1	O	CIS/CCD PI1 Signal	phob8	8mA
95	PI2	O	CIS/CCD PI2 Signal	phob8	8mA
96	GND9	P	Vss Supply	vss2i	-
97	PIrs	O	CIS/CCD PIrs Signal	phob8	8mA
98	PIcp	O	CIS/CCD PIsh Signal	phob8	8mA
99	ADC_CLK	O	AFE ADC Clock	phob8	8mA
100	VDD13	P	Vdd Supply	vdd3op	-
101	CDS2_CLK	O	AFE CDS2 Clock	phob8	8mA
102	SCLK1	O	AFE SIO Sync. Clock	phob8	8mA
103	SLOAD1	O	AFE SIO Read/Write Control Signal	phob8	8mA
104	VDD10	P	Vdd Supply	vdd3op	-
105	SDO1	O	AFE SIO Serial Output 1	phob8	8mA
106	SDIO1	B	AFE SIO Serial Inout/Output 1	phbst8	8mA
107	SDIO2	B	AFE SIO Serial Inout/Output 2	phbst8	8mA
108	GND10	P	Vss Supply	vss2i	-
109	AFE_D9	I	A/D Converted Data Bus [9]	ptis	-
110	AFE_D8	I	A/D Converted Data Bus [8]	ptis	-
111	AFE_D7	I	A/D Converted Data Bus [7]	ptis	-
112	AFE_D6	I	A/D Converted Data Bus [6]	ptis	-
113	VDD5	P	Vdd Supply	vdd2i	-
114	AFE_D5	I	A/D Converted Data Bus [5]	ptis	-
115	AFE_D4	I	A/D Converted Data Bus [4]	ptis	-
116	AFE_D3	I	A/D Converted Data Bus [3]	ptis	-
117	GND25	P	Vss Supply	vss3op	-
118	AFE_D2	I	A/D Converted Data Bus [2]	ptis	-
119	AFE_D1	I	A/D Converted Data Bus [1]	ptis	-
120	AFE_D0	I	A/D Converted Data Bus [0]	ptis	-
121	GND11	P	Vss Supply	vss2i	-
122	SRAM_A15	O	SRAM Address Bus [15]	phob8	8mA
123	SRAM_A14	O	SRAM Address Bus [14]	phob8	8mA
124	SRAM_A13	O	SRAM Address Bus [13]	phob8	8mA
125	SRAM_A12	O	SRAM Address Bus [12]	phob8	8mA
126	VDD14	P	Vdd Supply	vdd3op	-
127	SRAM_A11	O	SRAM Address Bus [11]	phob8	8mA
128	SRAM_A10	O	SRAM Address Bus [10]	phob8	8mA
129	SRAM_A9	O	SRAM Address Bus [9]	phob8	8mA
130	GND26	P	Vss Supply	vss3op	-
131	SRAM_A8	O	SRAM Address Bus [9]	phob8	8mA
132	SRAM_A7	O	SRAM Address Bus [9]	phob8	8mA
133	SRAM_A6	O	SRAM Address Bus [9]	phob8	8mA

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No	Pin Name	I/O	Description	Pad Type	Current drive
134	SRAM_A5	O	SRAM Address Bus [9]	phob8	8mA
135	GND12	P	Vss Supply	vss2i	-
136	SRAM_A4	O	SRAM Address Bus [9]	phob8	8mA
137	SRAM_A3	O	SRAM Address Bus [9]	phob8	8mA
138	SRAM_A2	O	SRAM Address Bus [9]	phob8	8mA
139	SRAM_A1	O	SRAM Address Bus [9]	phob8	8mA
140	VDD6	P	Vdd Supply	vdd2i	-
141	SRAM_A0	O	SRAM Address Bus [9]	phob8	8mA
142	SRAM_nWR	O	SRAM Write Enable Signal	phob8	8mA
143	SRAM_D15	B	SRAM Data Bus [15]	phbst8	8mA
144	SRAM_D14	B	SRAM Data Bus [14]	phbst8	8mA
145	GND27	P	Vss Supply	vss3op	-
146	SRAM_D13	B	SRAM Data Bus [13]	phbst8	8mA
147	SRAM_D12	B	SRAM Data Bus [12]	phbst8	8mA
148	SRAM_D11	B	SRAM Data Bus [11]	phbst8	8mA
149	GND13	P	Vss Supply	vss2i	-
150	SRAM_D10	B	SRAM Data Bus [10]	phbst8	8mA
151	SRAM_D9	B	SRAM Data Bus [9]	phbst8	8mA
152	SRAM_D8	B	SRAM Data Bus [8]	phbst8	8mA
153	SRAM_D7	B	SRAM Data Bus [7]	phbst8	8mA
154	VDD15	P	Vdd Supply	vdd3op	-
155	SRAM_D6	B	SRAM Data Bus [6]	phbst8	8mA
156	SRAM_D5	B	SRAM Data Bus [5]	phbst8	8mA
157	SRAM_D4	B	SRAM Data Bus [4]	phbst8	8mA
158	GND28	P	Vss Supply	vss3op	-
159	SRAM_D3	B	SRAM Data Bus [3]	phbst8	8mA
160	SRAM_D2	B	SRAM Data Bus [2]	phbst8	8mA
161	SRAM_D1	B	SRAM Data Bus [1]	phbst8	8mA
162	SRAM_D0	B	SRAM Data Bus [0]	phbst8	8mA
163	GND14	P	Vss Supply	vss2i	-
164	GPO7/PItg2	O	General Purpose Output [7]	phob8	8mA
165	GPO6/RLED	O	General Purpose Output [6]	phob8	8mA
166	GPO5/GLED	O	General Purpose Output [5]	phob8	8mA
167	GPO4/BLED	O	General Purpose Output [4]	phob8	8mA
168	VDD7	P	Vdd Supply	vdd2i	-
169	GPO3/PItg3	O	General Purpose Output [3]	phob8	8mA
170	GPO2/PIsh	O	General Purpose Output [2]	phob8	8mA
171	GPO1/ LEVEL_SHIFT	O	General Purpose Output [1]	phob8	8mA
172	GPO0	O	General Purpose Output [0]	phob8	8mA
173	GND29	P	Vss Supply	vss3op	8mA
174	GPIO2B/AFE_D11	B	General Purpose Input/Output 2 [11]	phbst8	8mA
175	GPIO2A/AFE_D10	B	General Purpose Input/Output 2 [10]	phbst8	-
176	GPIO29/AFE_D9	B	General Purpose Input/Output 2 [9]	phbst8	8mA
177	GND30	P	Vss Supply	vss3op	8mA
178	GPIO28/AFE_D8	B	General Purpose Input/Output 2 [8]	phbst8	8mA

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No	Pin Name	I/O	Description	Pad Type	Current drive
179	GPIO27/AFE_D7	B	General Purpose Input/Output 2 [7]	phbst8	8mA
180	GPIO26/AFE_D6	B	General Purpose Input/Output 2 [6]	phbst8	-
181	GPIO25/AFE_D5	B	General Purpose Input/Output 2 [5]	phbst8	8mA
182	VDD16	P	Vdd Supply	vdd3op	8mA
183	GPIO24/AFE_D4	B	General Purpose Input/Output 2 [4]	phbst8	8mA
184	GPIO23/AFE_D3	B	General Purpose Input/Output 2 [3]	phbst8	8mA
185	GPIO22/AFE_D2	B	General Purpose Input/Output 2 [2]	phbst8	8mA
186	GND15	P	Vss Supply	vss2i	8mA
187	GPIO21/AFE_D1	B	General Purpose Input/Output 2 [1]	phbst8	8mA
188	GPIO20/AFE_D0	B	General Purpose Input/Output 2 [0]	phbst8	8mA
189	GPIO1F/ SRAM_D15	B	General Purpose Input/Output 1 [15]	phbst8	8mA
190	GPIO1E/ SRAM_D14	B	General Purpose Input/Output 1 [14]	phbst8	-
191	GND31	P	Vss Supply	vss3op	8mA
192	GPIO1D/ SRAM_D13	B	General Purpose Input/Output 1 [13]	phbst8	8mA
193	GPIO1C/ SRAM_D12	B	General Purpose Input/Output 1 [12]	phbst8	-
194	GPIO1B/ SRAM_D11	B	General Purpose Input/Output 1 [11]	phbst8	4mA
195	GPIO1A/ SRAM_D10	B	General Purpose Input/Output 1 [10]	phbst8	-
196	VDD17	P	Vdd Supply	vdd3op	
197	GPIO19/SRAM_D9	B	General Purpose Input/Output 1 [9]	phbst8	
198	GPIO18/SRAM_D8	B	General Purpose Input/Output 1 [8]	phbst8	
199	GPIO17/SRAM_D7	B	General Purpose Input/Output 1 [7]	phbst8	
200	GND32	P	Vss Supply	vss3op	
201	GPIO16/SRAM_D6	B	General Purpose Input/Output 1 [6]	phbst8	-
202	GPIO15/SRAM_D5	B	General Purpose Input/Output 1 [5	phbst8	-
203	GPIO14/SRAM_D4	B	General Purpose Input/Output 1 [4]	phbst8	-
204	GPIO13/SRAM_D3	B	General Purpose Input/Output 1 [3]	phbst8	-
205	GND18	P	Vss Supply	vss3op	-
206	GPIO12/SRAM_D2	B	General Purpose Input/Output 1 [2]	phbst8	-
207	GPIO11/SRAM_D1	B	General Purpose Input/Output 1 [1]	phbst8	-
208	GPIO10/SRAM_D0	B	General Purpose Input/Output 1 [0]	phbst8	-

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3-2-4 PROGRAM ROM (FLASH MEMORY) CONTROL

1) DEVICE

TYPE No.	AM29LV160DB
CAPACITY	4 MBYTE (1MB * 16BITS * 2)

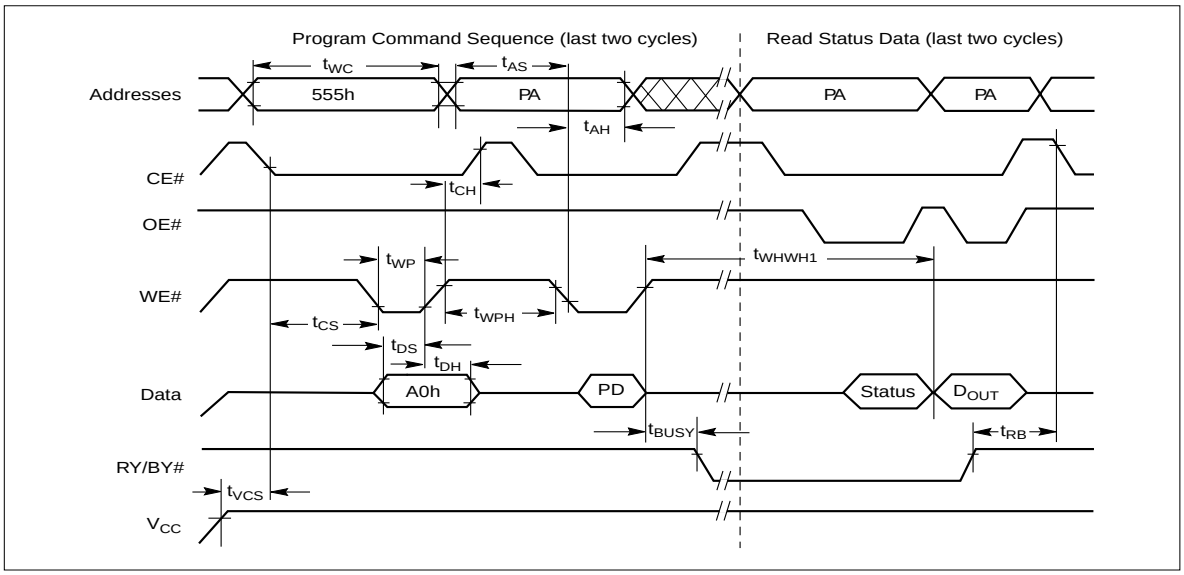
2) PROGRAMMING

BEFORE ASS'Y	EPROM PROGRAMMER or PROGRAMMING at the factory
AFTER ASS'Y	DOWNLOAD from PC

3) OPERATING PRINCIPLE

When the RCSO(ROM CHIP SELECT)signal is activated from the CPU after the POWER is ON, it activates RD SIGNAL and reads the DATA(HIGH/LOW) stored in the FLASH MEMORY to control the overall system. The FLASH MEMORY may also write. When turning the power on, press and hold the key(power switch) for 2 - 3 seconds, then the LED will scroll and the PROGRAM DOWNLOAD MODE will be activated. In this mode, you can download the program through the parallel port.

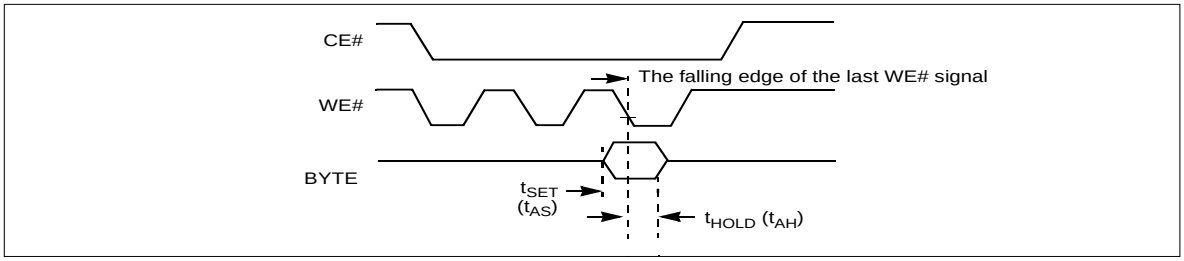
AC CHARACTERISTICS



Notes:

1. *PA = program address, PD = program data, D_{OUT} is the true data at the program address.*
2. *Illustration shows device in word mode.*

Figure 17. Program Operation Timings



Note: *Refer to the Erase/Program Operations table for t_{AS} and t_{AH} specifications.*

Figure 16. BYTE# Timings for Write Operations

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3-2-5 DRAM CONTROL

1) DEVICE

TYPE NO.	K4S
CAPACITY	16MBYTES (1M * 16BITS * 4Bank * 2)

2) OPERATING PRINCIPLE

DRAM can either read or write. The data can be stored in the DRAM only when the power is on. It stores data white the CPU processes data. The address to read and write the data is specified by RAS SIGNAL and CAS SIGNAL. DRAMWE*SIGNAL is activated when writing data and DRAMOE*SIGNAL, when reading. You can expand up to 64MBYTE of DRAM in this system.

Start Address ~ End Address	Contents
0x00000000 ~ 0x00FFFFFF	ROM Bank0
0x01000000 ~ 0x01FFFFFF	ROM Bank1
0x02000000 ~ 0x02FFFFFF	ROM Bank2
0x03000000 ~ 0x03FFFFFF	ROM Bank3
0x04000000 ~ 0x0FFFFFFF	Unused
0x10000000 ~ 0x1FFFFFFF	Special Function Registers
0x20000000 ~ 0x20FFFFFF	I/O Bank0
0x21000000 ~ 0x21FFFFFF	I/O Bank1
0x22000000 ~ 0x22FFFFFF	I/O Bank2
0x23000000 ~ 0x23FFFFFF	I/O Bank3
0x24000000 ~ 0x24FFFFFF	I/O Bank4
0x25000000 ~ 0x25FFFFFF	I/O Bank5
0x26000000 ~ 0x26FFFFFF	DMA I/O Bank0
0x27000000 ~ 0x27FFFFFF	DMA I/O Bank1
0x28000000 ~ 0x28FFFFFF	DMA I/O Bank2
0x29800000 ~ 0x29FFFFFF	DMA I/O Bank3
0x2A000000 ~ 0x2FFFFFFF	Unused
0x30000000 ~ 0x30FFFFFF	RSH SRAM
0x31000000 ~ 0x31FFFFFF	HPVC SRAM
0x32000000 ~ 0x32FFFFFF	MOTOR SRAM
0x33000000 ~ 0x37FFFFFF	Unused
0x38000000 ~ 0x38FFFFFF	USB CSR & FIFO
0x39000000 ~ 0x390003FF	USB PLUG DETECT
0x38000500 ~ 0x3FFFFFFF	Unused
0x40000000 ~ 0x4FFFFFFF	SDRAM array0 (bank 0)
0x50000000 ~ 0x5FFFFFFF	SDRAM array1 (bank 1)
0x60000000 ~ 0x6FFFFFFF	SDRAM array2 (bank 2)
0x70000000 ~ 0x7FFFFFFF	SDRAM array3 (bank 3)
0x80000000 ~ 0xBFFFFFFF	SDRAM array0~4 (Mirror)
0xC0000000 ~ 0xC00007FF	MAC
0xC0000800 ~ 0xC0FFFFFF	Unused

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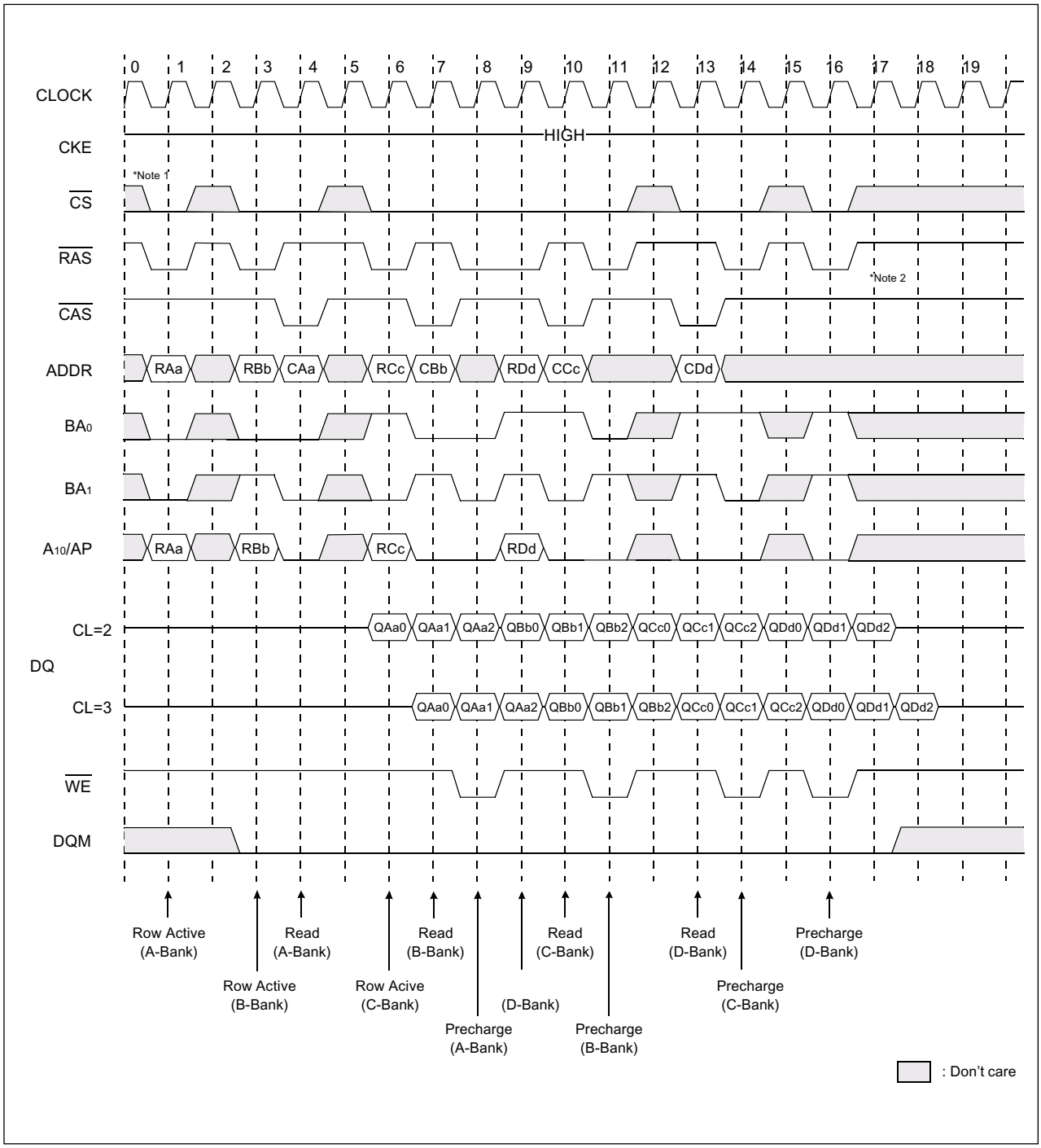
3-2-5-1 SDRAM read timing

Basically the Extended Data Out DRAM is similar to Fast Page Mode DRAM. For FPM, the data are valid only when the nCAS is active while reading the internal data, however, it has a latch that the data will be continuously outputted even after the nCAS is inactivated.
While configuring the software, you must set the timing register of SFR considering the clock speed and the DRAM spec.



* Note : 1. $\overline{CS}$ can be don't cared when $\overline{RAS}$, $\overline{CAS}$ and $\overline{WE}$ are hih at the clock high going dege.
2. To interrupt a burst read by row precharge, both the read and the precharge banks must be the same.

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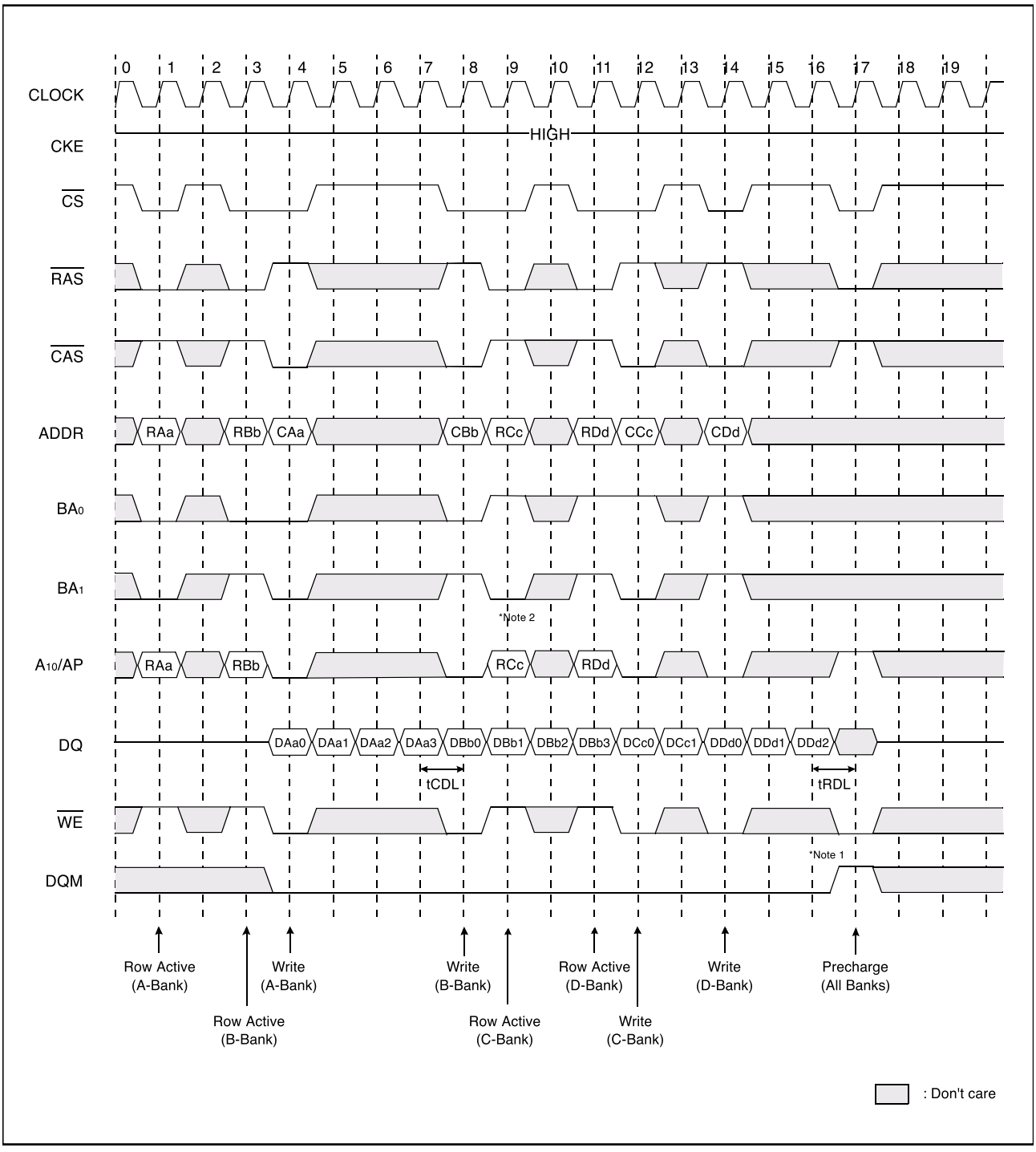
3-2-5-2 SDRAM write timing



*Note : 1. To interrupt burst write by Row precharge, DQM should be asserted to mask invalid input data.
2. To interrupt burst wrige by Row precharge, both the write and the prechargebanks must be the same.

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3-2-6 FS781 (FREQUENCY ATTENUATOR)

This system used FS741 for the main clock for EMI SUPPRESSION.
It spreads the source clock in a consistent bandwidth to disperse the energy gathered in order to attenuate the energy.
The capacitor value of the loop filter(PIN 4) is set depending on the source clock used or the spread bandwidth. Refer to FS781 Spec. for detail.

3-2-7 USB (Universal Serial Bus)

NS's USBN9602 is used as the interface IC and 48MHz clock is used.
When the data is received through the USB port, EIRQ1 SIGNAL is activated to send interrupt to CPU, then it directly sends the data to DRAM by IOCS4*&DRAMA(11) SIGNAL through DRAMD (24;31).

3-2-8 SRAM : 1MByte SRAM K6F1008U2C

It stores a variety of option data.

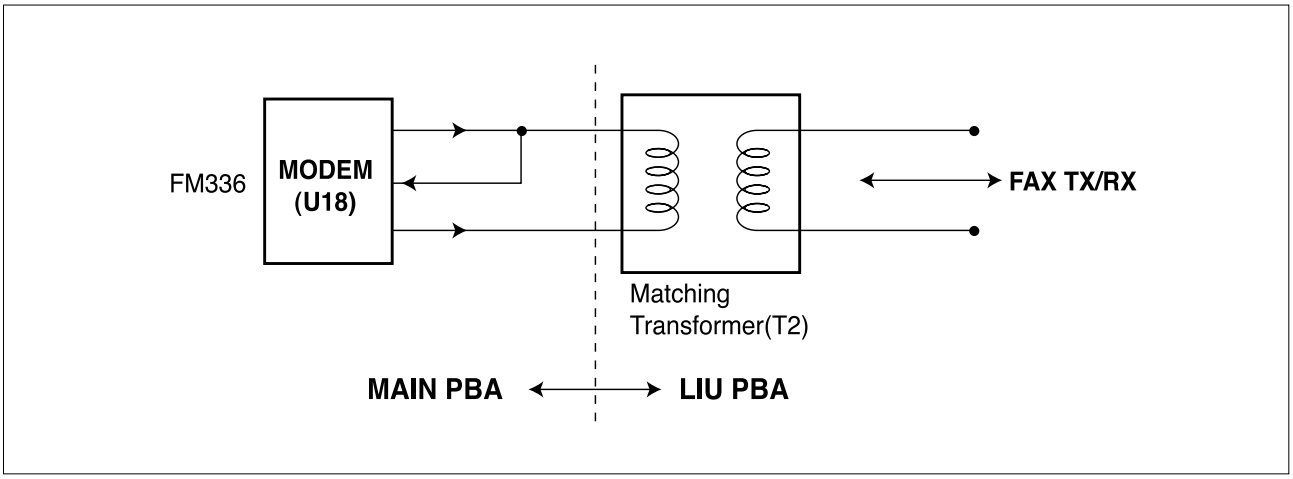
3-2-9 FAX Transceiver

3-2-9-1. GENERAL

This circuit processes transmission signals of modem and between LIU and modem.

3-2-9-2. modem (u44)

FM336 is a single ship fax modem. It has functions of DTMF detection and DTMF signal production as well as functioins of modem. TX A1, 2 is transmission output port and RX IN is received data input port. / POR signal controlled by MFP controller (U3:ARM946ES) can initialize modem (/M_RST) without turning off the system. D0-D7 are 8-bit data buses. RS0-RS4 signals to select the register in modem chips. /RS and /WR signals control READ and WRITE respectively. /IRQ is a signal for modem interrupt.
Transmission speed of FM336 is supported up to 33.6k.
The modem is connected to LINE through transformer directly.



< FAX TRANSCEIVER >

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3-3 Scanner

3-3-1 SUMMARY

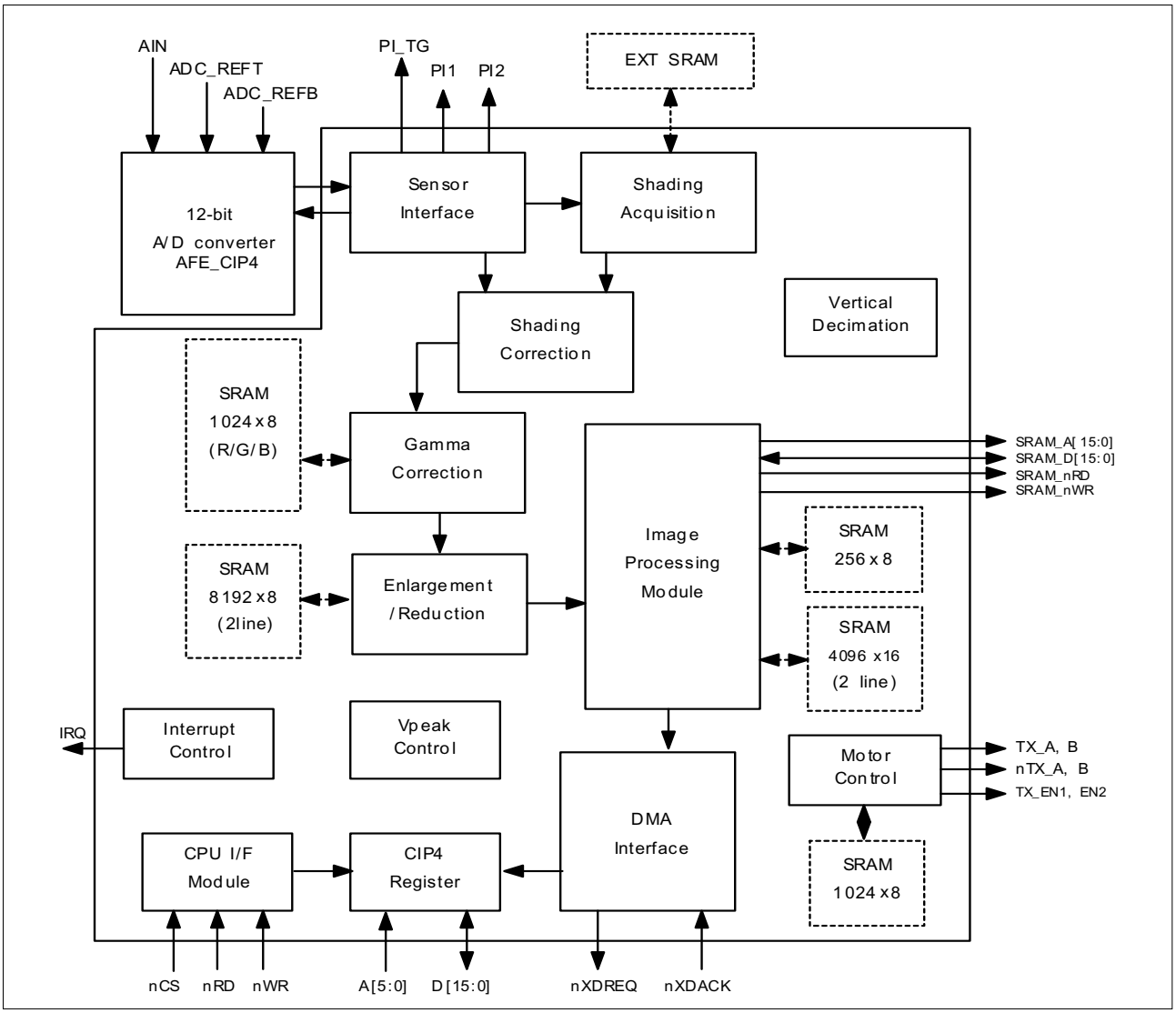
This flat-bed type device to read manuscripts has 600dpi CCD as an image sensor. There is one optical sensor for detecting CCD home position and Scan-end position. The home position is detected by a optical sensor which is attached to the CCD Module. The Scan-end position is calculated by numer of motor step.

CCD

Charge Coupled Device improves productivity and allows a compact design.

This machine uses a color CCD.

- Minimum Scan Line Time for One Color : 2.5mSec
- Light Source Power : +18V
- Maximum Pixel frequency : 10MHz
- Effective Sensor Element : 5340 X 3
- Clamp Level : 0.7~ 0.8V
- Bright Output : MIN 0.8V



<Block Diagram>

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3-3-2 Key Features

Overview

(1) 0.5µm C-MOS process(TLM), 208-PIN QFP, STD85 library
(2) Frequency : Max PLL 80 MHz
(3) On-Chip oscillator
(4) Method : Raster scanning method
(5) Image Sauce : 300/400/600dpi CIS & CCD
(6) Scanning Mode
- color gray image: each 8 bits / RGB
- mono gray image: 8 bits / pixel
- binary image: 1 bit / pixel (for text/phoot/mixed mode)

(7) Maximum scanning width : A3, 600dpi (8K effective pixels)
(8) Ideal MSLT (A4, 600/300dpi)
- color gray image: 3x5Kx80nsec = 1.2msec (7/28 CPM)
- mono gray image: 1x5Kx80nsec = 0.4msec (21/84 CPM)
- binary image: 1x5Kx80nsec = 0.4msec (21/84 CPM)

(9) A/D conversion depth : 12bits

Pixel processing structure

- Minimum pixel processing time : 4 system clocks
- High speed pipelined processing method
(Shading correction, Gamma correction, Enlargement/Reducement, and Binarization)

Shading Correction

(1) White shading correction support for each R/G/B
(2) White shading data memory : 3x8Kx12bits = 288Kbits → 384Kbits (external)
(3) Black shading data memory : 3x8Kx12bits = 288Kbits → 384Kbits (external)

Gamma Correction

(1) Independent Gamma table for each RGB component
(2) Gamma table data memory : 3x1Kx8bits = 24Kbits (internal)

Binarization (mono)

(1) 256 Gray's halftone representation for Photo document : 3x5 EDF(Error DifFusion) method proposed by Stucki.
(2) LAT(Local Adaptive Thresholding) for Text document :
- use of 5x5 LOCAL WINDOW (TIP ALGORITHM)
- ABC(Automatic Background Control) :Tmin Automatic change

(3) Mixed mode processing for text/photo mixed document
(4) EDF data memory : 2x4Kx16bits = 128Kbits (internal)
(5) LAT data memory : 4x4Kx16bits = 256Kbits (external)

Scaling of input image

(1) Scaling factor
- Horizontal direction: 25 ~ 800% by 1% unit
- Vertical direction: 25 ~ 100% by 1% unit

(2) Scaling data memory : 2x8Kx8bits = 128Kbits (internal)

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Intelligent scan motor controlloer

(1) Automatic acceleration/deceleration/uniform velocity
(2) Data memory : 256x16bits = 4Kbits (internal)

Auto-Run

Automatic CLK_LINE (line processing start control) and •'TG (line scan start control) signal generation|

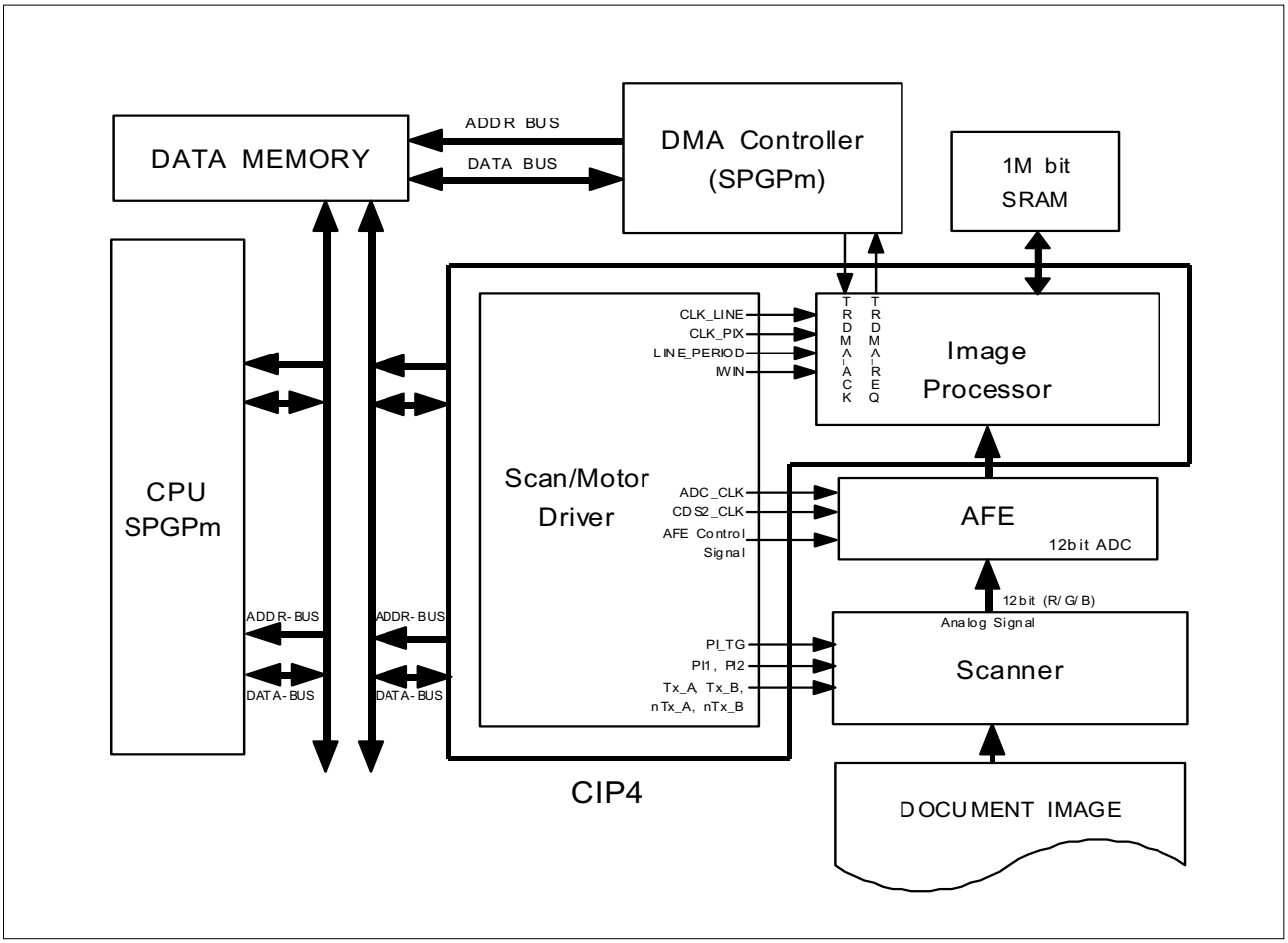
(1)Available resynchronization of øTG signal
(2) programmable øTG's period & CLK_LINE's occurrence number

Processed data output format in DTM(Data Transfer Module)

(1)DMA mode : Burst/On-demand mode
(2) CDIP I/F : LINE_SYNC, PIXEL_SYSNC, PIXEL_DATA[7:0]

36 General Purpose Input/Output : 8(GPO), 28(GPIO)

Black/White reversion, and Image Mirroring support



<External interfce with CIP4>

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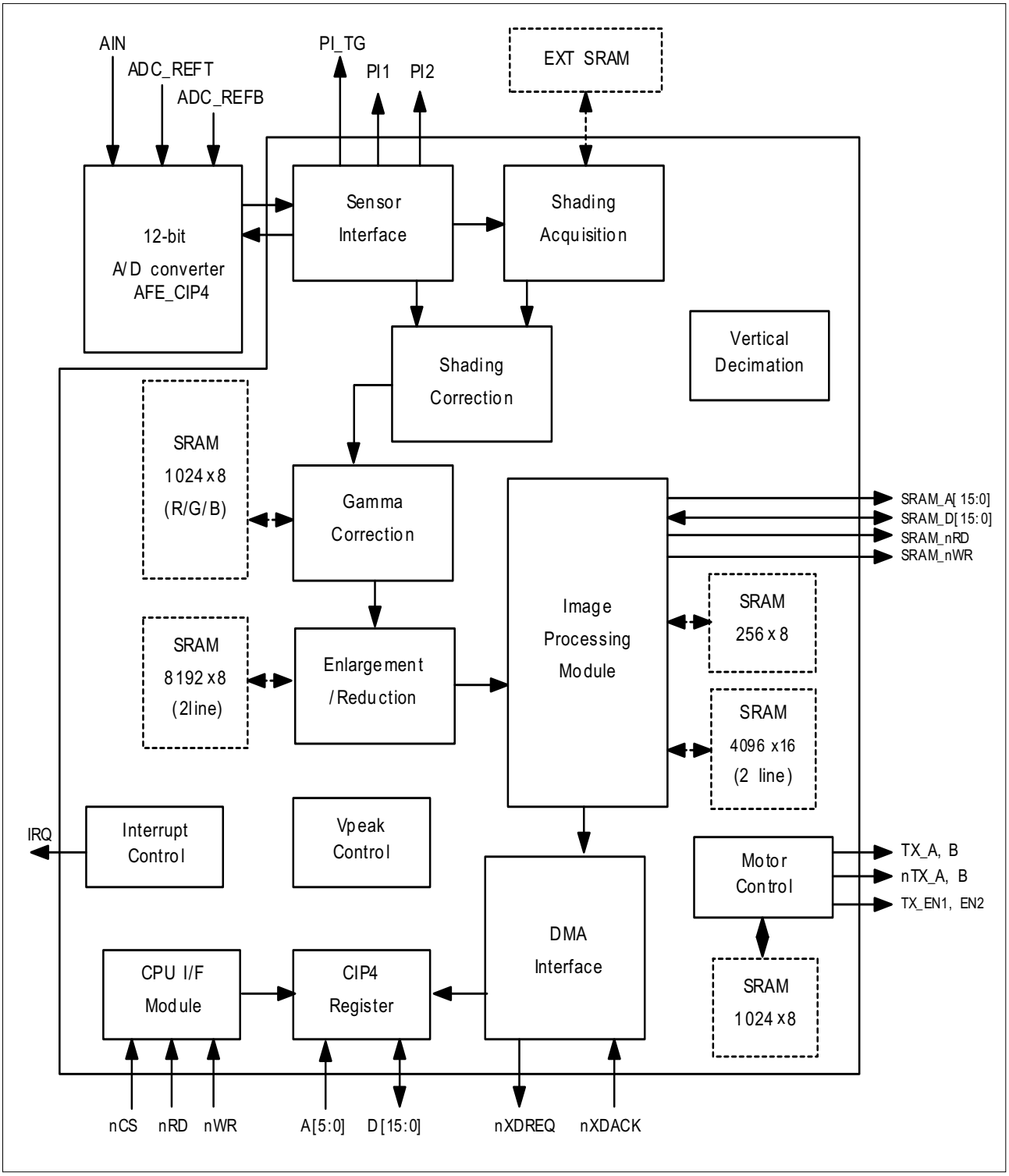

<Block diagram of CIP4>

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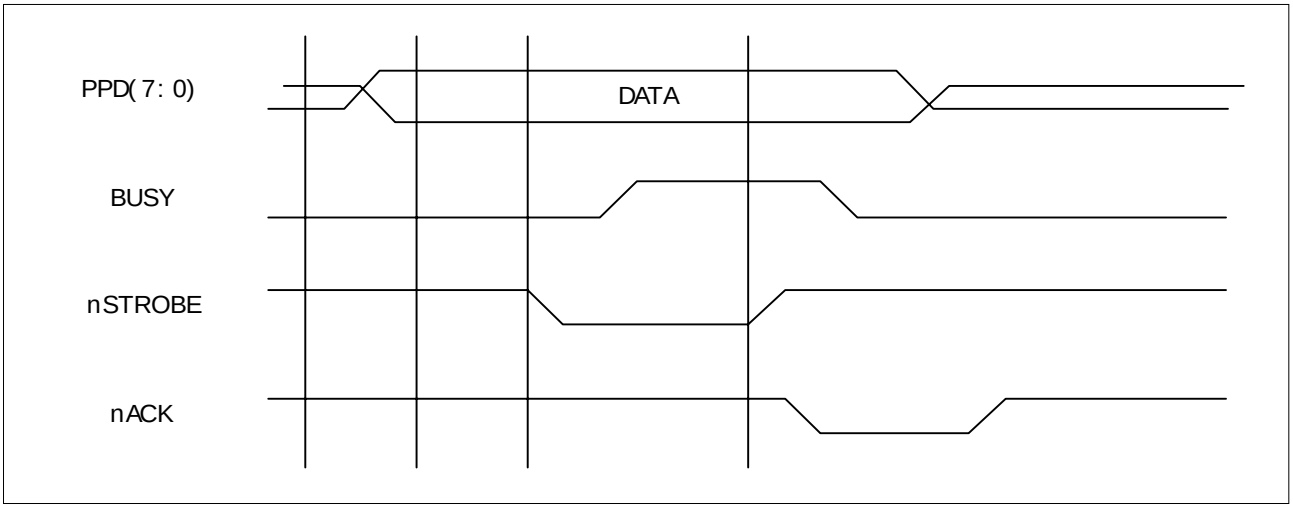
3-4 HOST INTERFACE:

Referred to IEEE 1284 standard.

3-4-1. Host Interface

PARALLEL PORT INTERFACE PART ARM946ES has the Parallel Port Interface Part that enables Parallel Interface with PC. This part is connected to PC through Centronics connector. It generates major control signals that are used to actuate parallel communication. It is comprised of/ERROR, PE, BUSY, /ACK, SLCT, /INIT, /SLCTIN, /AUTOFD and /STB. This part and the PC data transmission method support the method specified in IEEE P1283 Parallel Port Standard (http://www.fapo.com/ieee1284.html). In other words, it supports both compatibility mode (basic print data transmitting method), the nibble mode (4bit data; supports data uploading to PC) and ECP (enhanced capabilities port: 8bits data - high speed two-way data transmission with PC). Compatibility mode is generally referred to as the Centronics mode and this is the protocol used by most PC to transmit data to the printer. ECP mode is an improved protocol for the communication between PC and peripherals such as printer and scanner, and it provides high speed two-way data communication. ECP mode provides two cycles in the two-way data transmission; data cycle and command cycle. The command cycle has two formats; Run-Length Count and Channel Addressing. RLE (Run-Length Count) has high compression rate (64x) and it allows real-time data compression that it is useful for the printer and scanner that need to transmit large raster image that has a series of same data. Channel Addressing was designed to address multiple devices with single structure. For example, like this system, when the fax/printer/scanner have one structure, the parallel port can be used for other purposes while the printer image is being processed.This system uses RLE for high speed data transmission. PC control signals and data send/receive tasks such as PC data printing, high speed uploading of scanned data to PC, upload/download of the fax data to send or receive and monitoring the system control signal and overall system from PC are all processed through this part.



<Compatibility Hardware Handshaking Timing>

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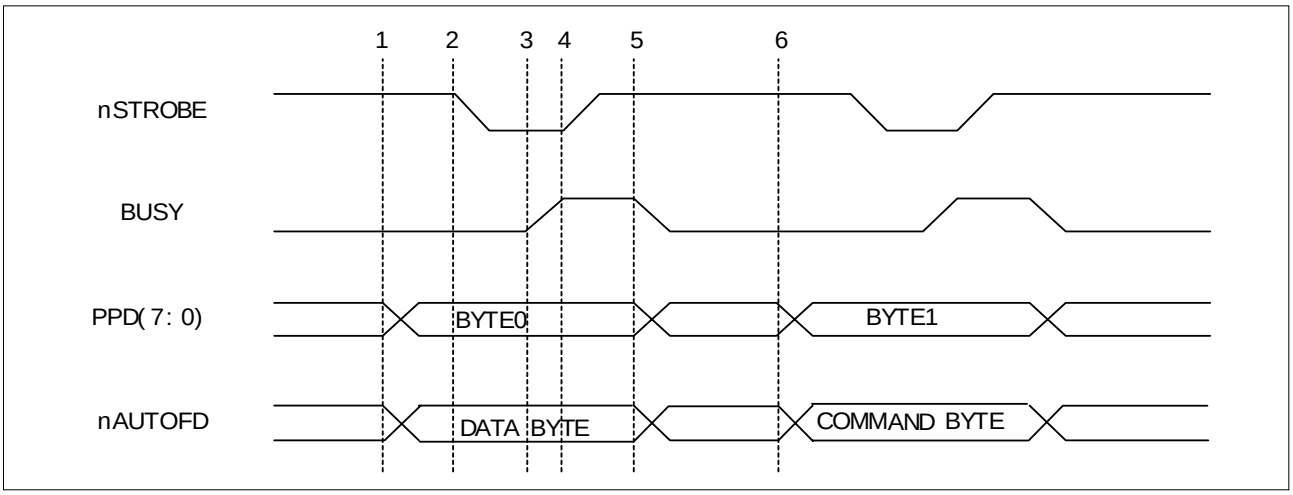
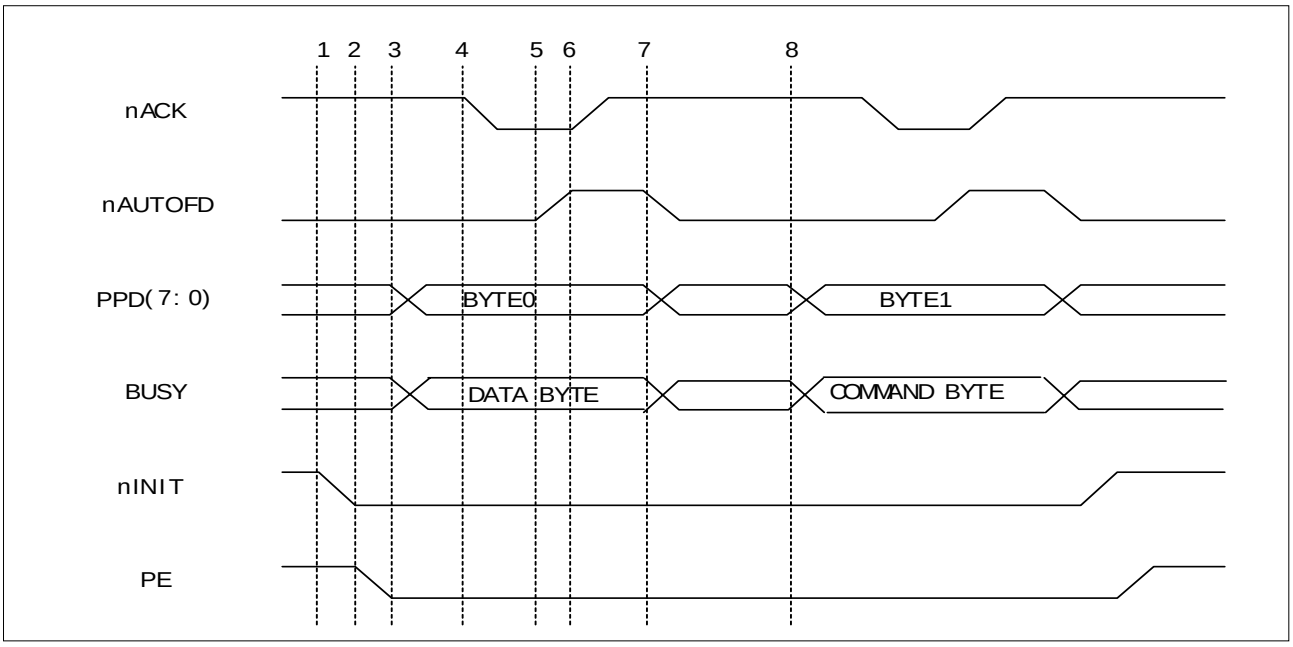


<ECP Hardware Handshaking Timing (forward) >

1. The host places data on the data lines and indicates a data cycle by setting nAUTOFD
2. Host asserts nSTROBE low to indicate valid data
3. Peripheral acknowledhes host by setting BUSY high
4. Host sets nSTROBE high. This is the edge that should be used to clock the data into the Peripheral
5. Peripheral sets BUSY low to indicate that it is ready for the next byte
6. The cycle repeats, but this time it is a command cycle because nAUTOFD is low



<ECP Hardware Handshaking Timing (forward)

1. The host request a reverse channel transfer by setting nINIT low
2. The peripheral signals that it is OK to proceed by setting PE low
3. The peripheral places data on the data lines and indicates a data cycle by setting BUSY high
4. Peripheral asserts nACK low to indicate valid data
5. Host acknow ledges by setting nAUTOFD high
6. Peipheral sets nACK high. This is the edge that should be used to clock the data into the host
7. Host sets nAUTOFD low to indicate that it is ready for the next byte
8. The cycle repeats, but this time it is a command cycle because BUSY is low

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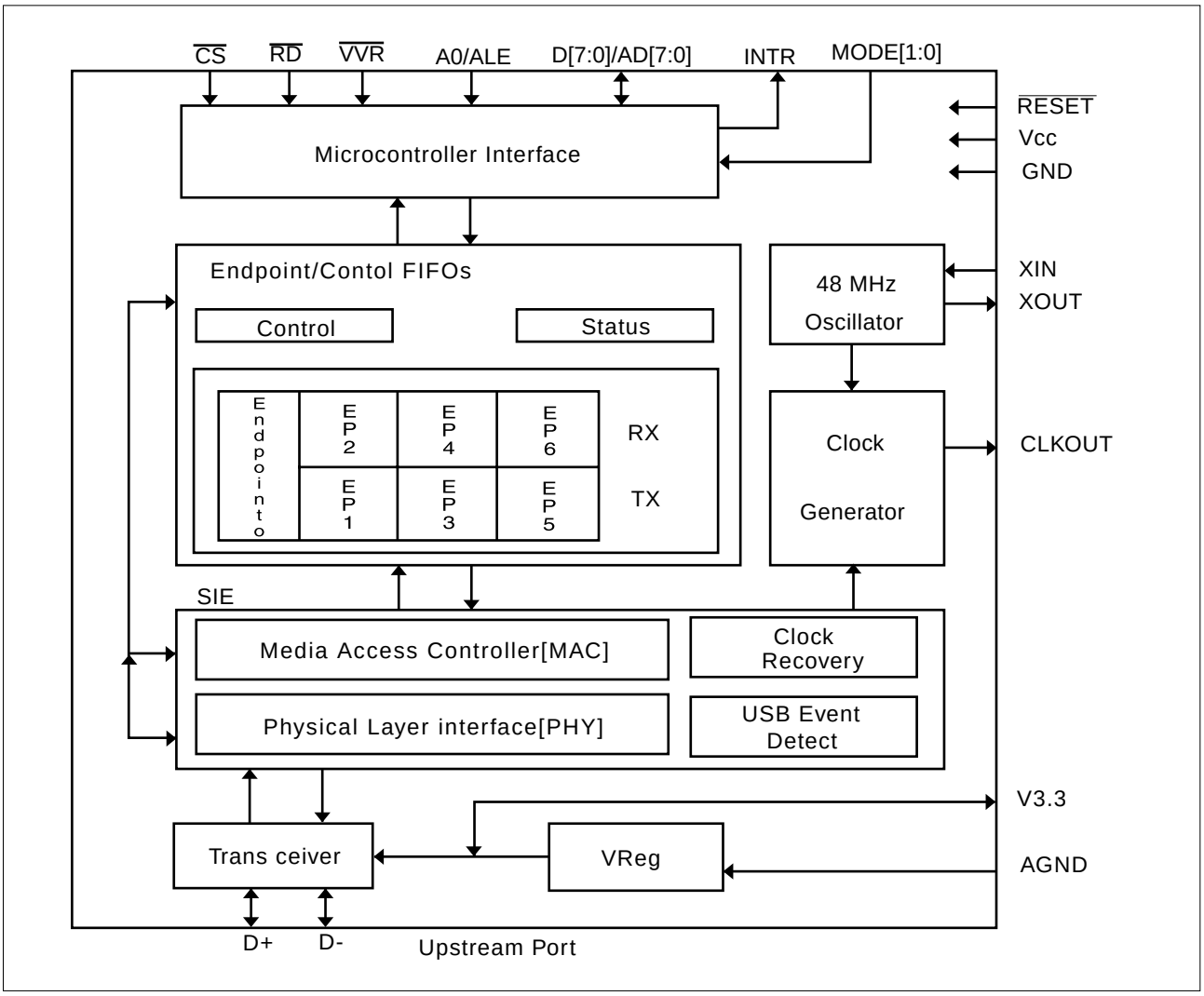
3-4-2 USB INTERFACE



3-4-2-1 Features

- Full-Speed USB Node Device
- USB transceiver
- 3.3V signal voltage regulator
- 48 MHz oscillator circuit
- Programmable clock generator
- Serial Interface Engine consisting of Physical Layer In-terface (PHY) and Media
- Access Controller (MAC), USB Specification 1.0 compliant
- Control/Status Register File
- USB Function Controller with seven FIFO-based End-points :
- One bidirectional Control Endpoint 0 (8bytes)
  - Three Transmit Endpoints (2*32 and 1*64 bytes)
- Three Receive Endpoints (2*32 and 1*64 bytes)
- 8-bit parallel interface with two selectable modes :
  - non-multoplexed
- multiplexed (Intel compatible)
- DMA support for parallel interface
- MICROWIRE/PLUS Interface
- 28-pin SO package

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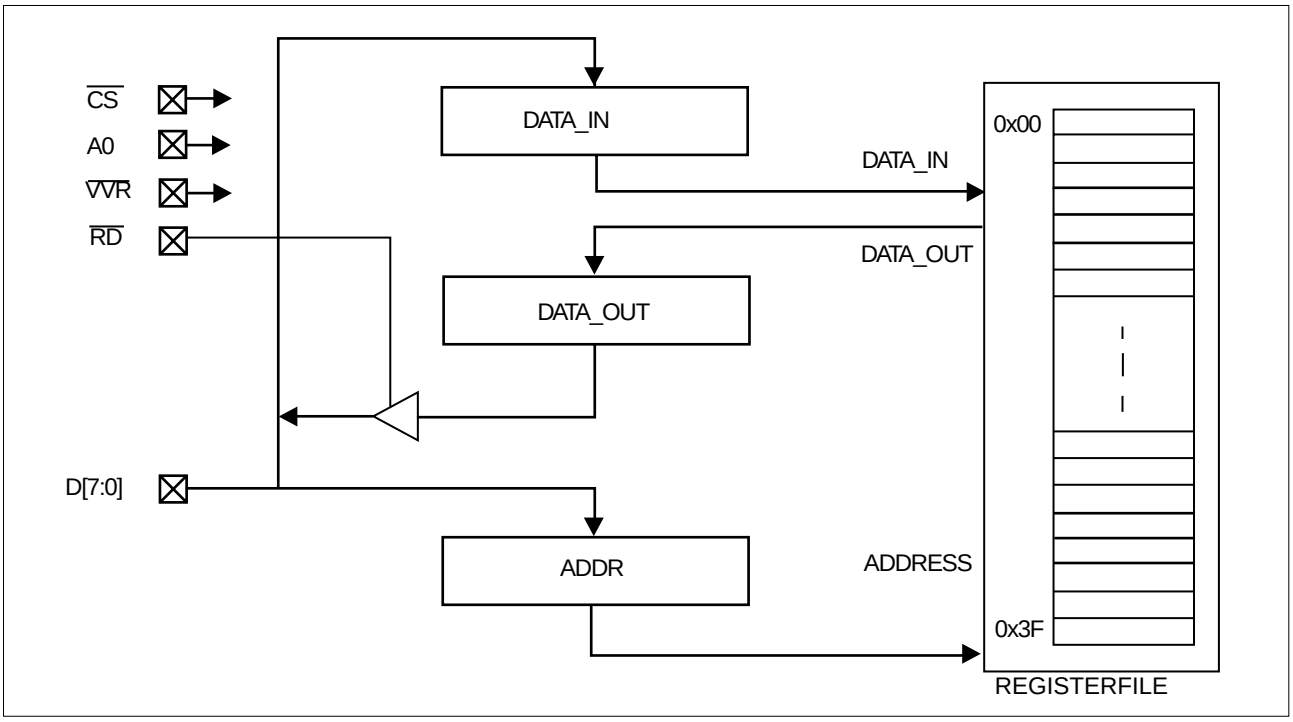
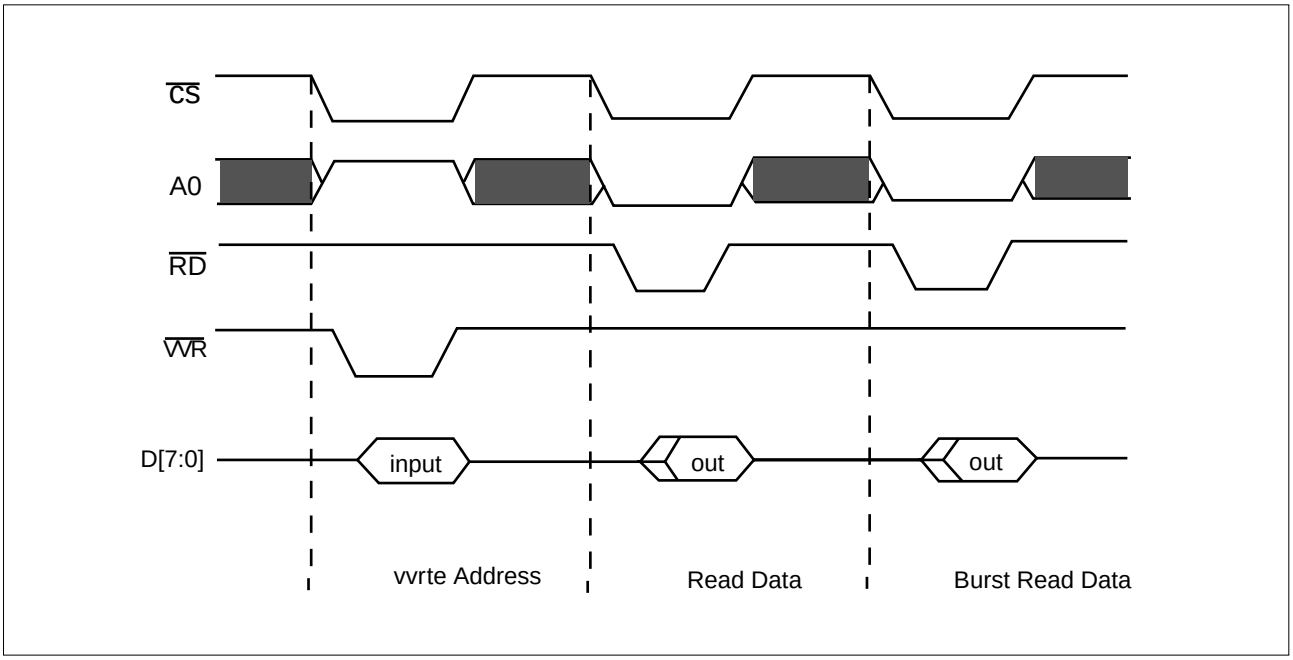


<Non-Multiplexed Mode Interface Block Diagram>



<Non-Multiplexed Mode Basic Timing Diagram>

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3-5 Engine Controller

3-5-1. Fuser Control / Thermistor Circuit

This circuit controls the heat lamp temperature to fix the transferred toner on the paper. It is comprised of the thermistor that has the negative resistance against the temperature and LM393 (voltage comparator) and transistor for switching.
The thermistor has the resistance value reverse proportional to the heat lamp surface temperature. The voltage value is read by #60 pin(AVIN2) of CPU refering to the parallel combined resistance with the resistor(R43) connected parallel to it and the voltage distribution of R29. The voltage read activates (inactivates) 'fuser' signal to high (or low) referring to the set temperature and when the 'fuseron' signal turns down(high) to low(high) by Q3 switching, the S21ME4 inside SMPS (PC3) turns on(off) and this eventually turns two-way thyristor(SY1) on(off) to allow(shut) AC voltage to the heat lamp.

LM393 is a H/W designed to protect the system when the software heat lamp control does not run normal. When the thermistor temperature goes up to 210°C, #1 pin's level (LM393) will turn low to turn the 'fuseron' signal to high. (forcefully shuts off Q3)In other words LM393 shuts off the heat lamp forcefully.

3-5-2. Paper Sensing Circuit

1) Cover Open Sensing

Cover Open Sensor is located on the right rear side of the printer. In case the right cover is open, it shuts +5V (LSU laser unit) and +24V(main motor, polygon motor of fixer LSU and HVPS) that are supplied to each unit. It detects the cover opening through CPU. In this case, the red LED of the OP Panel LED will turn on.

2) Paper Empty Sensing

The paper empty sensor (photo interruptor), located inside bottom of the bin cassette detects paper with the actuator connected to it and informs the CPU of whether there is paper. When there is no paper in the cassette, the red LED of the OP panel LED will turn on to tell the user to fill the cassette with papers.

3) Paper Feeding When the paper is fed into the set and passes through the actuator of the feed sensor unit, transistor inside the photo interrupter will turn on, 'nFEED' signal will turn low and inform CPU that the paper is currently fed into the system. CPU detects this signal and sprays video data after certain time (related to paper adjustment). If the paper does not hit the feed sensor within certain time, CPU detects this and informs as "Paper Jam0" (red LED on the OP panel will turn on).

4) Paper Exit Sensing

The system detects the paper going out of the set with the exit sensor assembled to the actuator attached to the frame. If CPU does not turn back high a while after the paper hits the exit sensor, CPU detects this and inform as "Paper Jam2" (red LEDs on the OP panel will turn on).

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3-5-3. LSU Circuit

1) Polygon Motor Unit (actuated by +24V)

The polygon motor inside LSU rotates by the 'PMOTOR' signal. When it reaches the motor constant velocity section through the initial transient (transient response) section, it sends the 'nLREADY' signal to the CPU.

The 'clock' pin is the pin that receives clock of the required frequency when LSU uses external CLK as the motor rotational frequency. Currently the external clock circuit is located in the HVPS and 1686Hz = 6.9083MHz (crystal frequency)÷212(74HC4060N IC), is used as the rotational frequency of the polygon motor.

2) Laser Unit (actuated by +5V)

After laser is turned on by 'nLD_ON' signal, it is reflected by 6 mirrors (polygon mirror) attached to the polygon motor and performs scan in horizontal way.When the laser beam hits the corner of the polygon mirror, it generates 'nHSYNC' signal (pulse) and the CPU forms the left margin of the image using this signal (horizontal synchronous signal).

3-5-4. Fan/Solenoid Actuation Circuit

The fan actuation circuit its power using NPN TR. When it receives 'FAN' signal from the CPU. The TR will turn on to make the voltage supplied to the fan to 24V in order to actuate the fan.
The solenoid is actuated in the same way. When it receives control signal from the CPU, the solenoid for paper feeding is actuated by switching circuit.
D29(1N4003) diode is applied to the both ends of the output terminal to protect Q22(KSC1008-Y) from noise pulse induced while the solenoid is de-energized.

3-5-5. PTL Actuation Circuit

PTL actuation circuit switches its power using NPN TR.

3-5-6. Motor Actuation Circuit

Motor actuation circuit is determined while selecting the initial driver IC (provided by the vendor). This system uses TEA3718(U57, U58), A2918(U59)'s motor driver IC. However, the sensing resistance (R273, R274, R292, R293) and reference resistance (R284, R289, R294, R295) can vary depending on the motor actuation current value.
It receives motor enable signal (2 phase) from CPU and generates bipolar pulse (constant-current) and sends its output to stepping motor input.

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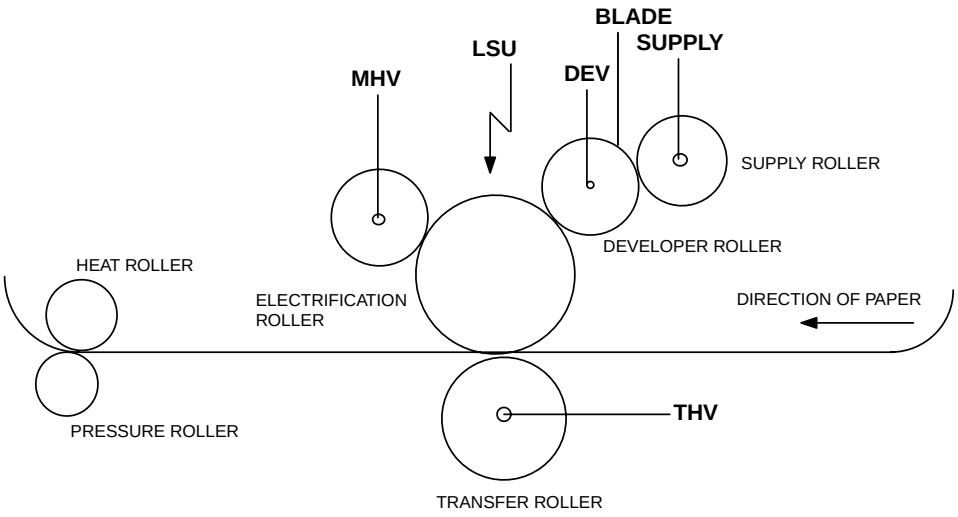
3-5-7. High Voltage Power Supply

3-5-7-1. Summary

It is the high voltage power supply that has DC+24V/DC+5V (used for the image forming device in OA digital picture developing method) as the rated inputs. It supplies electrifying voltage (MHV), supply voltage (SUPPLY), developing voltage (DEV), blade voltage(BLADE) and transferring voltage (THV).
Each high voltage supply shows the voltage required in each digital picture process.

3-5-7-2. Digital Picture Process

Digital picture developing method is widely used by copy machine, laser beam printer and fax paper.
The process is comprised of electrification, exposure, develop, transfer and fixing.



First, in the electrification process, retain constant charge at approx. -900V for the electric potential on the OPC surface by electrifying OPC drum at approx. -1.4KV through the electrification roller.
The electrified surface of OPC is exposed responding to the video data by the LSU that received print command due to rotation. The unexposed non-video section will retain the original electric potential of -900V, but the electric potential of the image area exposed by LSU will be approx. -180V that it will form the electrostatic latent image. The surface of the photo-conductive drum where the electrostatic latent image is formed reaches the developer as the drum rotates. Then the electrostatic latent image formed on the OPC drum is developed by the toner supplied to the developing roller by supplying roller and it is transformed into visible image. It is the process to change the afterimage on the OPC drum surface formed by LSU into visible image by the toner particles.
While the supply roller energized with -450V by HVPS and the developer roller energized with -300V rotate in the same direction, it keeps the toner particles between two rollers supplied to OPC drum in negative state by the friction between two rollers.
The toner supplied to the developer roller is biased to bias electric potential by the developer roller and transferred to the developing area. After (-) toner is attached to the developer roller, it will move to the exposed high electric potential surface (-180V) rather than to the unexposed low electric potential surface (-900V) of the developer roller and OPC drum. Eventually the toner will not settle in the low electric potential surface to form the visible image.
Later, the OPC drum continues to rotate and reaches to transfer location in order to accomplish the transfer process.
This process transfers the (-)toner on the transfer roller to the printing paper by the transfer roller. The (-)toner attached to the OPC drum will be energized to hundreds to thousands of the (+)transfer voltage by HVPS. The (+)electrostatic force of the transfer roller generated has higher adhesiveness than the (-)toner OPC drum and thus it moves to the surface of the paper passing through the transfer roller.
The toner transferred to the paper with weak electrostatic force is fixed to the paper by the pressure and heat of the fixer composed of pressure roller and heat roller.
The toner attached to the paper is melted by applying the heat (approx. 180°C) from the heat roller and the pressure (approx. 4kg) from the pressure roller. After the fixing process, the paper is sent out of the set to finish the printing process.

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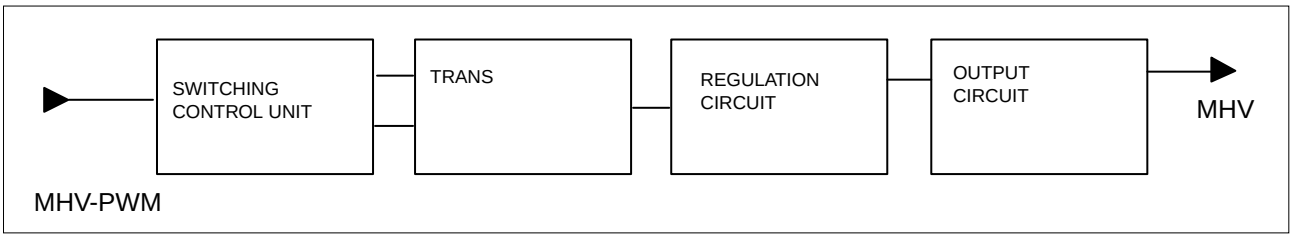
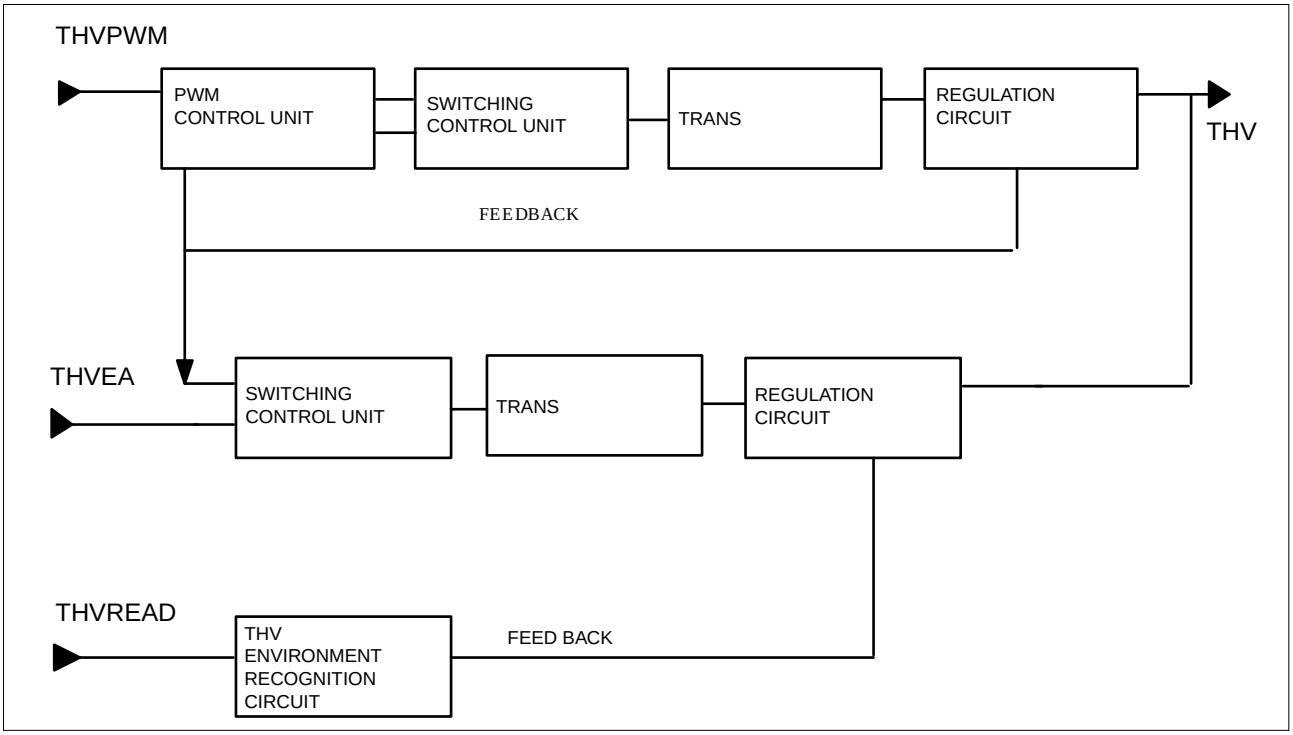
3-5-7-3. Organization of the Device

HVPS is comprised of electrification output unit, bias output unit and transfer output unit.

1) Input Unit
2) Electrification Output (Enable) Unit: MHV (Main High Voltage)
3) Bias Output (Enable) Unit: DEV (Development Voltage)/Supply(Supply Voltage)/BLADE(Blade Voltage)
4) Transfer '+' Output (Enable) Unit: THV(+)(Transfer High Voltage(+))
5) Transfer '-' Output (Enable) Unit: THV(-)(Transfer High Voltage(-))
6) Switching Unit
7) Feedback Unit
8) Regulation Unit
9) Output Unit



<Electrification Unit Block-Diagram>



<Transfer Output Unit Block Diagram>

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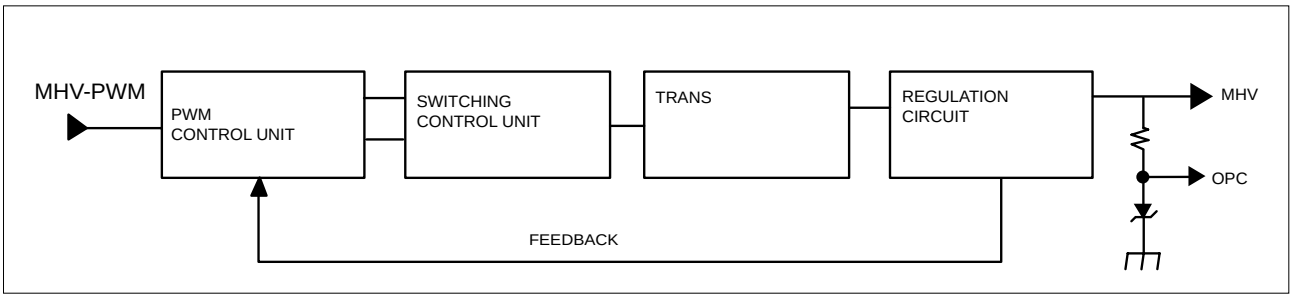
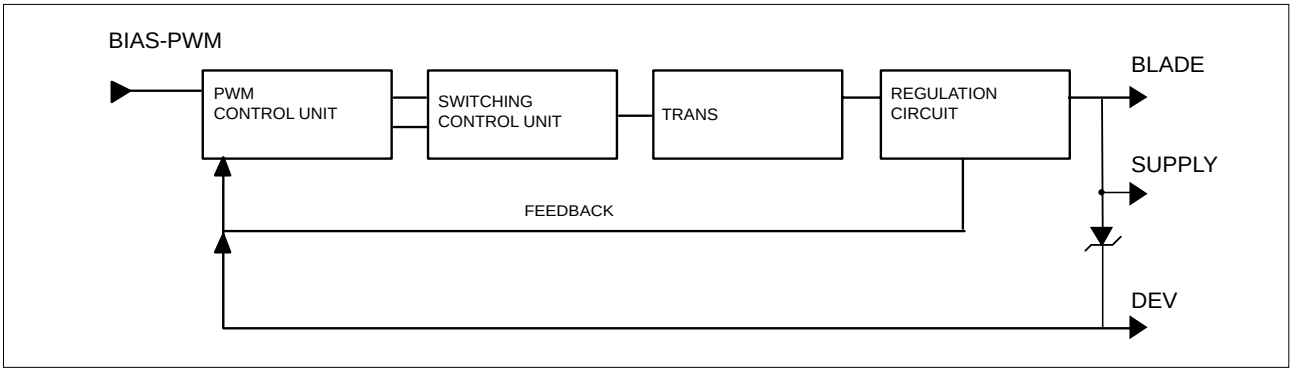


<MHV Output unit Block Diagram>



<BIAS Output Unit Block Diagram>

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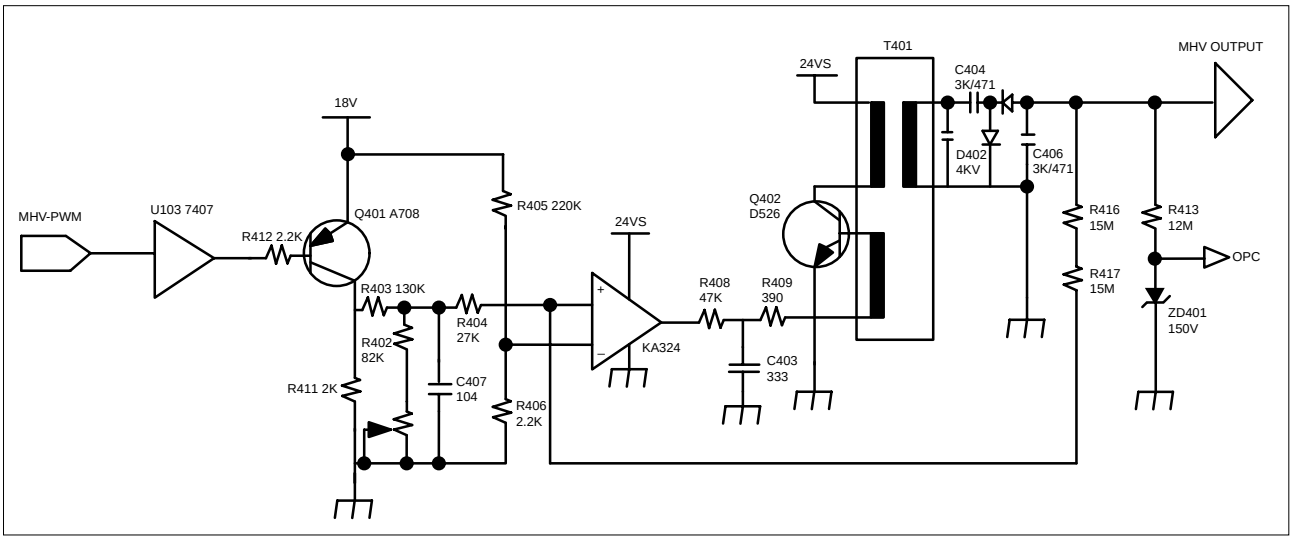
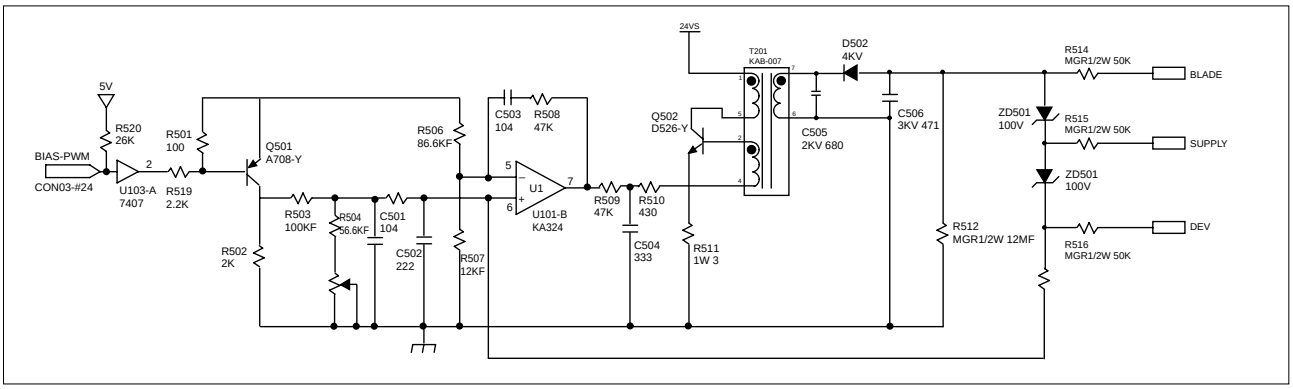
3-5-7-4 MHV (Electrification Output Enable)

Electrification Output Enable is the electrification output control signal 'PWM-LOW ACTIVE'.
When MHV-PWM LOW signal is received, Q401 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage higher than the inverting reference voltage of OP-AMP, which is set to R405 and R406, OP-AMP output turns high. This output sends IB to the TRANS auxiliary wire through current-restricting resistance Q402 via R408 and C403 and Q402 turns on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T401 primary coil, and when it reaches the Hfe limit of Q402, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary unit, sends current to the load and outputs MHV voltage through the high voltage output enable, which is comprised of Regulation– circuit.



3-5-7-5 BIAS (supply/dev/blade output unit)

BIAS (Electrification Output Enable)Electrification Output Enable is the electrification output control signal 'PWM-LOW ACTIVE'.When BIAS-PWM LOW signal is received, Q501 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage higher than the inverting reference voltage of OP-AMP, which is set to R506 and R507, OP-AMP output turns high. This output sends IB to the TRANS auxiliary wire through current-restricting resistance Q502 via R509 and C504 and Q502 turns on. When the current is accepted to Q502, Ic increases to the current proportional to time through the T201 primary coil, and when it reaches the Hfe limit of Q502, it will not retain the "on" state, but will turn to "off". As Q502 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary unit, sends current to the load and outputs DEV voltage through the high voltage output enable, which is comprised of Regulation-circuit.



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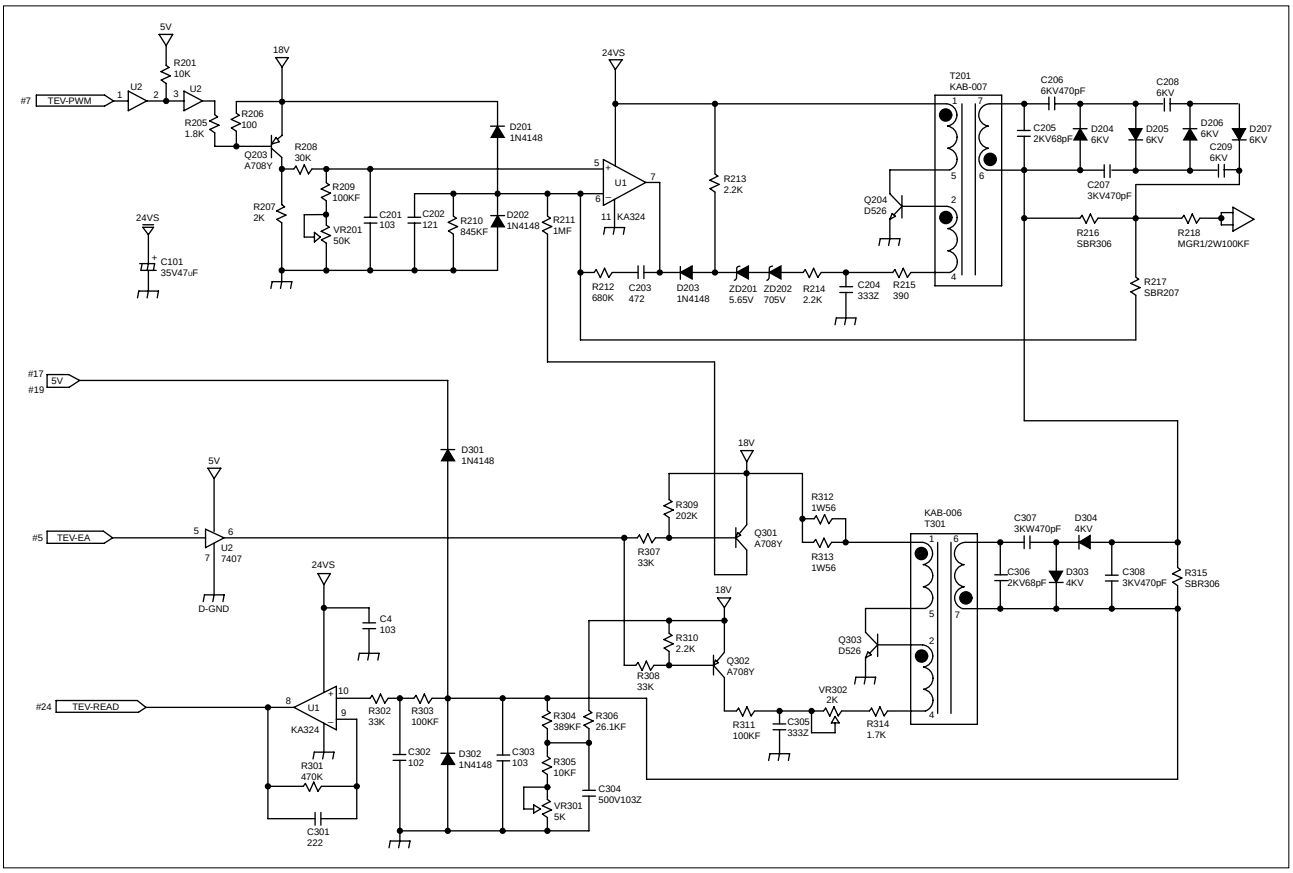
3-5-7-6. THV(THV(+)/THV(-) Output Unit)

Transfer(+) output unit is the transfer output control signal 'PWM-LOW ACTIVE'.
When THV-PWM LOW signal is received, Q203 turns on and the steady voltage will be accepted to the non-inverting terminal of OP-AMP 324. As the voltage is higher than the inverting reference voltage of OP-AMP, OP-AMP output turns high.
The 24V power adjusts the electric potential to ZD201 and ZD202, sends IB to TRANS auxiliary wire through current-restricting resistance R215 via R212 and C204, and eventually Q204 will turn on. When the current is accepted to Q402, Ic increases to the current proportional to time through the T201 primary coil, and when it reaches the Hfe limit of Q204, it will not retain the "on" state, but will turn to "off". As Q402 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, sends current to the load and outputs THV voltage through the high voltage output enable, which is comprised of Regulation– circuit. The output voltage is determined by the DUTY width. Q203 switches with PWM DUTY cycle to fluctuate the output by fluctuating the OP-AMP non-inverting end VREF electric potential, and the maximum is output at 0% and the minimum, at 100%.Transfer(-) output unit is THV-EA 'L' enable.
When THV-EA is 'L', Q302 turns on and the VCE electric potential of Q302 will be formed and sends IB to TRANS auxiliary wire through R311, C305 and VR302 via current-restricting resistance R314, and eventually Q303 will turn on. When the current is accepted to Q303, Q303's Ic increases to the current proportional to time through the T301 primary coil, and when it reaches the Hfe limit of Q303, it will not retain the "on" state, but will turn to "off". As Q303 turns 'off', TRANS N1 will have counter-electromotive force, discharge energy to the secondary coil, send current to load and output THV(-) voltage through the high voltage output enable, which is comprised of Regulation– circuit.



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3-5-7-7. Environment Recognition

THV voltage recognizes changes in transfer roller environment and allows the voltage suitable for the environment in order to realize optimum image output. The analog input is converted to digital output by the comparator that recognizes the environmental changes of the transfer roller. It is to allow the right transfer voltage to perform appropriate environmental response considering the environment and the type of paper depending on this digital output by the programs that can be input to the engine controller ROM.

This environment recognition setting is organized as follows: First, set the THV(+) standard voltage.
Allow 200MΩ load to transfer output, enable output and set the standard voltage 800V using VR201.
Then set 56 (CPU's recognition index value) as the standard using VR302.
This standard value with CPU makes sure that the current feedback is 4μA when output voltage is 800V and load is 200MΩ.
If the load shows different resistance value when 800V is output, the current feedback will also be different and thus the index value will also be different. according to the index value read by CPU, the transfer voltage output will differ according to the preset transfer table.
The changes in transfer output required by each load is controlled by PWM-DUTY.

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3-6 OPE PBA

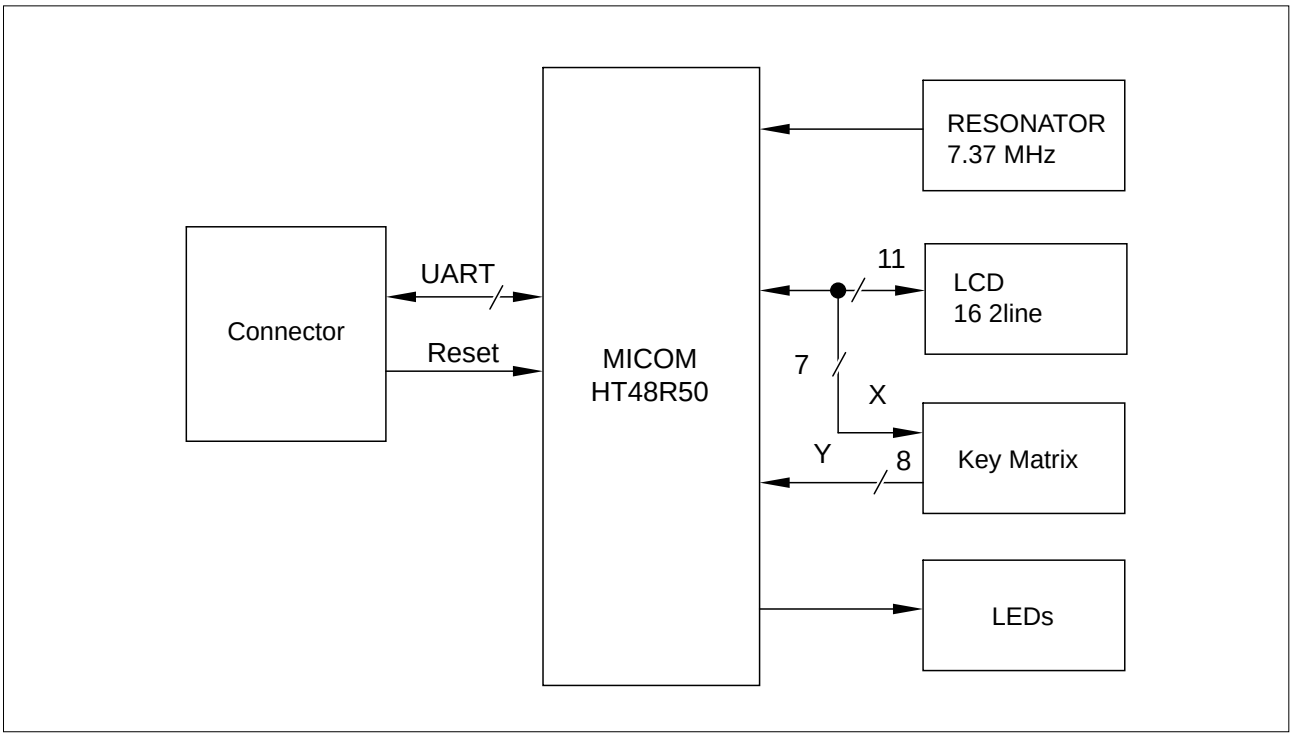
3-6-1 SUMMARY

OPE Board is separated functionally from the main board and operated by the micom(HT48R50) in the board. OPE and the main use UART (universal asynchronous receiver/transmitter) channel to exchange information. OPE reset can be controlled by the main. OPE micom controls key-scanning and LCD and LED display. If there occurs an event in OPE (such as key touch), it sends specific codes to the main to respond to the situation and the main analyzes these codes and operates the system. For example, it the main is to display messages in OPE, the main transmits data through UART line to OPE according to the designated format and OPE displays this on LCD, LED. OPE's sensing is also transmitted to the main through UART line and then the main drives necessary operation.

OPE PBA consists of U1(MICOM, HT48R50),LCD, key matrix, LED indicators. Refer to OPE Schematic Diagram and Wiring Diagram sections of this manual.

• Signals from the key matrix are delivered to U1 input pin group (D1~D6)
• U1 pin 48 (TX DATA) is the UART code sent to MAIN PBA.

• Display from the controller is received at U1 pin 5(RX DATA).
• LCD drive signals are sent from U1 P2-x pin group, P3-4~P3-6 pins.
• Machine status LED drive signals are sent from U1 LED0~LED7.



<OPE BLOCK DIAGRAM>

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3-7 LIU PBA

3-7-1. SUMMARY

LIU WIRE CONNECTS Main B'D's MODEM AND LINE PARTS, AND IMPEDANCE MATCHING (AC, DC), RING DETECTION PART and LINE SEIZURE (DIALER).

3-7-2. DC MATCHING PART

Normal movement range of LIU is 12mA ~ 9mA.
Adapting CTR21 standard, the regulation limits to 60mA CURRENT flow through the terminal.
Therefore, select (*:for EU PIT) Option to connect necessary items then the current through LIU will not exceed 60mA.

• CTR21 Standard(Europe) : 12mA~60mA • OTHER Standard (U.S.) : 12mA~90mA

DC has a character to pass through the LINE. And with Q1 (VN2410) GATE section's LINE INPUT corrent and Q1 Source connection to R20, can be decided as follows :

• -VDCR = VL1 + ILINE X R20

(VDCR : Tip-Ring CD Voltage, ILINE : Current flow)VL1:Line Input Voltage, VL1=VBD1+VCE(Q2)+VDS(Q1)

3-7-3. AC MATCHING PART

Basic LIU's AC IMPEDANCE is 600 and uses R47. 48. C36 to possibly control combined IMPEDANCE.

• U.S. Usage : A terminal IMPEDANCE Æ 600W(±30%)
• CTR21 : A Terminal IMPEDANCE Æ 270+750W//150nF

3-7-4. DIALER PART

***MF DIAL**

DTMF Dialing is controlled by MODEM and should be selected by appropriate LEVEL and On-off Time output based on each countries' own National specification.

• Freq. Tolerance : ±1.5%
High Group : 1209, 1336, 1477, 1633Hz
Low Group : 697, 770, 852, 941 Hz

	U.S. Usage	CTR21
High Freq Level	-9.0+2.0/-2.5	-7.0 +1.0/-2.0
Low Freq Level	-9.0+1.0/-2.0	-11.0+2.5/-2.0

***DP DIAL**

Controls from MAIN through / DP-Terminal.
for U.S.Usage, set time to DF signal of 40:60 M/B. DP signal is made of U6 (pcb817). The DC current which flows thru Q2 Base is regulated by On/Off switch and turns to DP dial signal with a COUPLER.

• CTR 21 does not have telephone capability but has the number 3 and 4 Line Connection. No DP condition but possibility to get approval only on DTMF Dial based terminal.

3-7-5. RING DETECTION PART

RING SIGNALS from the LINE section (TIP, RING)are further passed through C5, R3, ZD1, and ZD2 and ends up at U9, (PC 814). U9 then detects above RING SIGNAL and passes the output to MAIN B'D. The wilre diagram's C5 is RINGER CAPACITOR and it normally uses 1UF/250V.
A R3 limits AC current and controls upper and lower REN meter.

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3-8 SMPS (Switching Mode Power Supply) Unit.

3-8-1 SMPS Specifications

The SMPS (Switching Mode Power Supply) Unit used here is a PWM (Pulse Width Modulation) type power supply unit that supplies DC+5V to controller and control panel, and DC+5V, DC+24V and DC+12V to the engine. It also supplies AC power to fixer heat lamp.

No.	Output Channel	Ch.1	Ch.2	Ch.3
1	Channel Name	+5.1V	+24.0V	+12.0V
2	Rated Output Voltage	+5.1V	+24.0V	+12.0V
3	Rate Output Current	2A	2.5A	0.8A
4	Maximum Load Current and Load Pattern	2.5A Continued	3.0A Continued	0.8A Continued
5	Load Change Range	0.5~2.0A	0.1~0.3A	0.1~0.8A
6	Rate output voltage (For rated I/O)	+5.1V±5% (+4.84~+5.35V)	+24.0V±10% (+21.60~+26.40V)	+12V±5% (+11.40~+12.60V)
7	1) Total Output Voltage Deviation (Input, Load, Temp., Aging) 2) Dynamic Input Change 3) Dynamic Load Change	Including All +5.1V±5% (+4.84~+5.35V) Including Set Error	Including All +24.0V±10% (+21.60~+26.40V) Including Set Error	Including All +12V±5% (+11.40~+12.60V) Including Set Error
8	Refer to ripple & noise 27	150mVp-p or less	500mVp-p or less	200mVp-p or less
9	Refer to load short and overload protection 23 Refer to load short and overload protection 23	Must not ignite or generate smoke when output shorted for 5 sec.	Output voltage must shutdown withing the range of 3.5A~6.5A	Must not ignite or generate smoke when output shorted for 5 sec.

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3-8-2 AC Input Stage

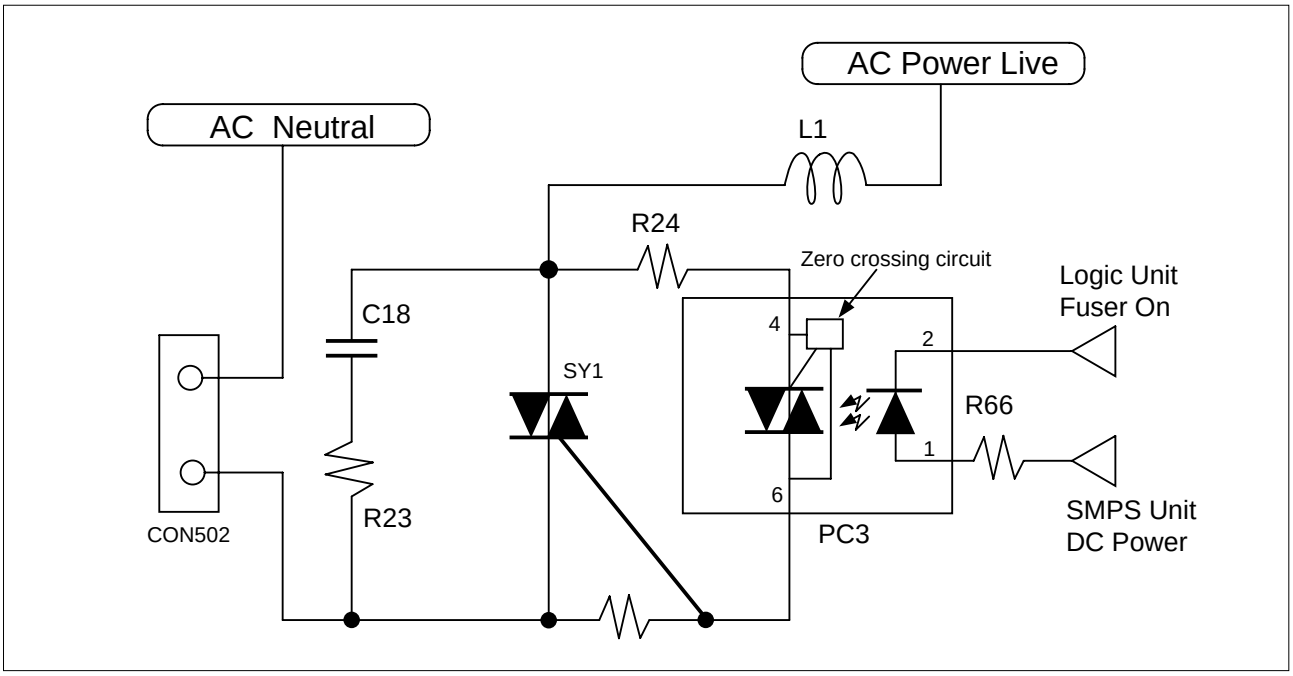
AC Input power path is consist of the Fuse (F1) for AC current limit, the Varistor (TNR1) for by-passing high Voltage Surge, the discharge resistor(R1), the AC Impalse Noise Filtering Circuit (C2, C4, LF1), the Common Mode Grounding Circuit (C5, C6), the 2'nd noise filter (C7, LF2), and the thermistor (TH1).
Wher power is turned on, TH 1 limits Inlush-Current by it's high resistanle, and When it's temperature rise, it's resistance become about Zero ohm.

3-8-3 SMC(Switched Mode Control)

The AC input voltage is rectified and filtered by BD1 and C10 to create the DC high voltage applied to the primary winding of T1, Q5 pin #1 is driven by the SMPS device IC2, IC2. auto-starts and chops the DC voltage. The U502 is PWM SMPS IC and has internally a SMC(switched mode control) IC and a MOSFET output stage. The SMC IC has a Auto-restart without a Power Supply for the IC and a Thermal Shutdown function and so on. R4, R5, C11, D1 clamp leading-edge voltage spikes caused by transformer leakage inductance. The power secondary winding(Pin #5~6)is rectified and filtered by D8, D9, L2, C33, C34 to create the 5V output voltage. The bias winding(Pin #9~8)is rectified and filltered by D2 and C12 to create U502 bias voltage. The secondary output 5V is regulated through the path of the voltage divide by R34, R35.

3-8-4. Fixed Temperature Control

3-8-4-1. Fixed Lamp Control Circuit



<Fixed Lamp Control Circuit>

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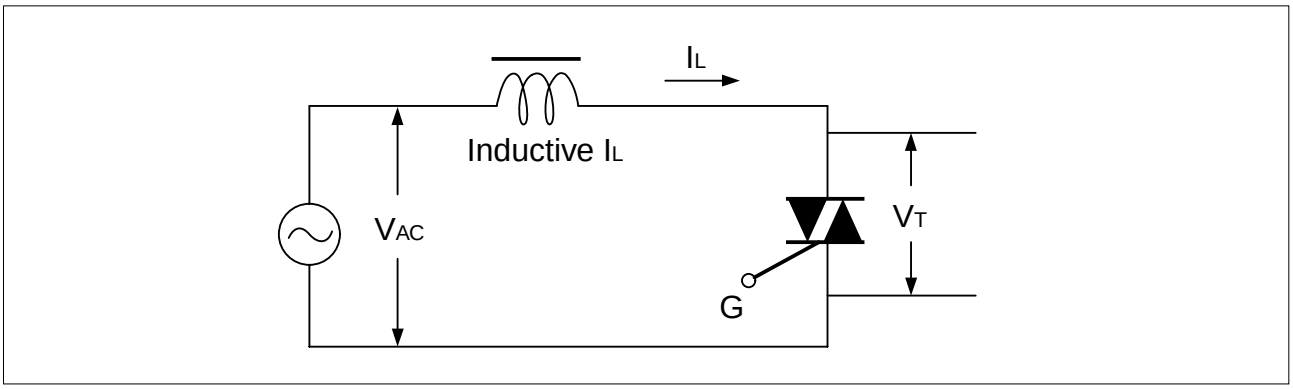
3-8-4-2. The Concept of Fixed Lamp Control

For fixed lamp control, the logic unit "fuser on" control signal and SMPS unit DC power must be supplied. This circuit turns on only when "fuser on" sends the signal and the DC power is supplied.
The following explains how the fixed lamp control circuit works.
logic unit "fuser on" sends trigger current to triac driver PC3 LED, then the infrared ray is detected by PC3 photo detector. Next, YC3 triac is conducted.
The conducted current sends trigger input to triac SY1 gate. At this point, SY1 is conducted and AC power is supplied to fixed lamp. Lamp is turned on and temperature rises.
As this fixed lamp control circuit uses the AC voltage ("+" and "-" are repeated) as the power supply, it used two-way triac (SY1), which has advantage over one-way SCR considering the price, size and reliability.
Triac's gate can be triggered by either forward or reverse signal. Once triac is turned on, it will not be controlled by gate signal, but will be continuously on until the current between major terminals decreases below the holding current. In other words, you cannot turn it off with reverse signal unlike SCR. This property is called current-voltage threshold rise rate (commutation: dv/dt). In AC power control application, triac has to turn off conduction in each zero crossing or switch it twice in each cycle. This switching operation is called commutation. It is possible to turn off the triac at the end of half cycle by eliminating the gate signal when the load current (IL) is gained at the level equal to or lower than holding current. When triac commutes off-line, the direction of the voltage of the both ends of triac will be reversed and increase up to the maximum value of line voltage (VAC). At this point, the width of rise rate will be determined by dv/dt and overshoot voltage, by the circuit. When triac commutes off-line, the voltage of both ends of triac will have the same voltage as the line voltage.



<Inductive Circuit>

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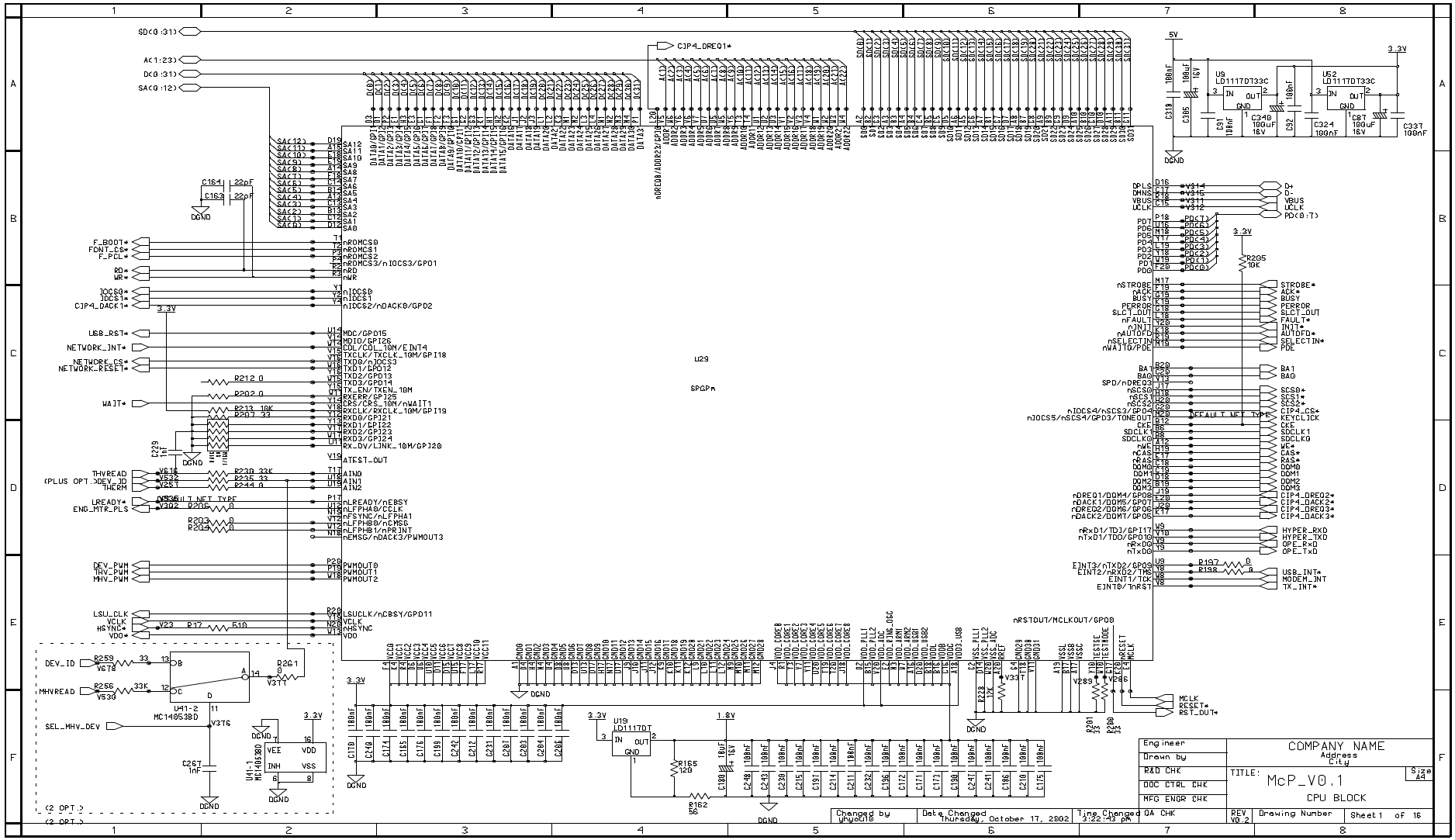
4. Schematic Diagrams

4-1 Main Circuit Diagram (1/16)



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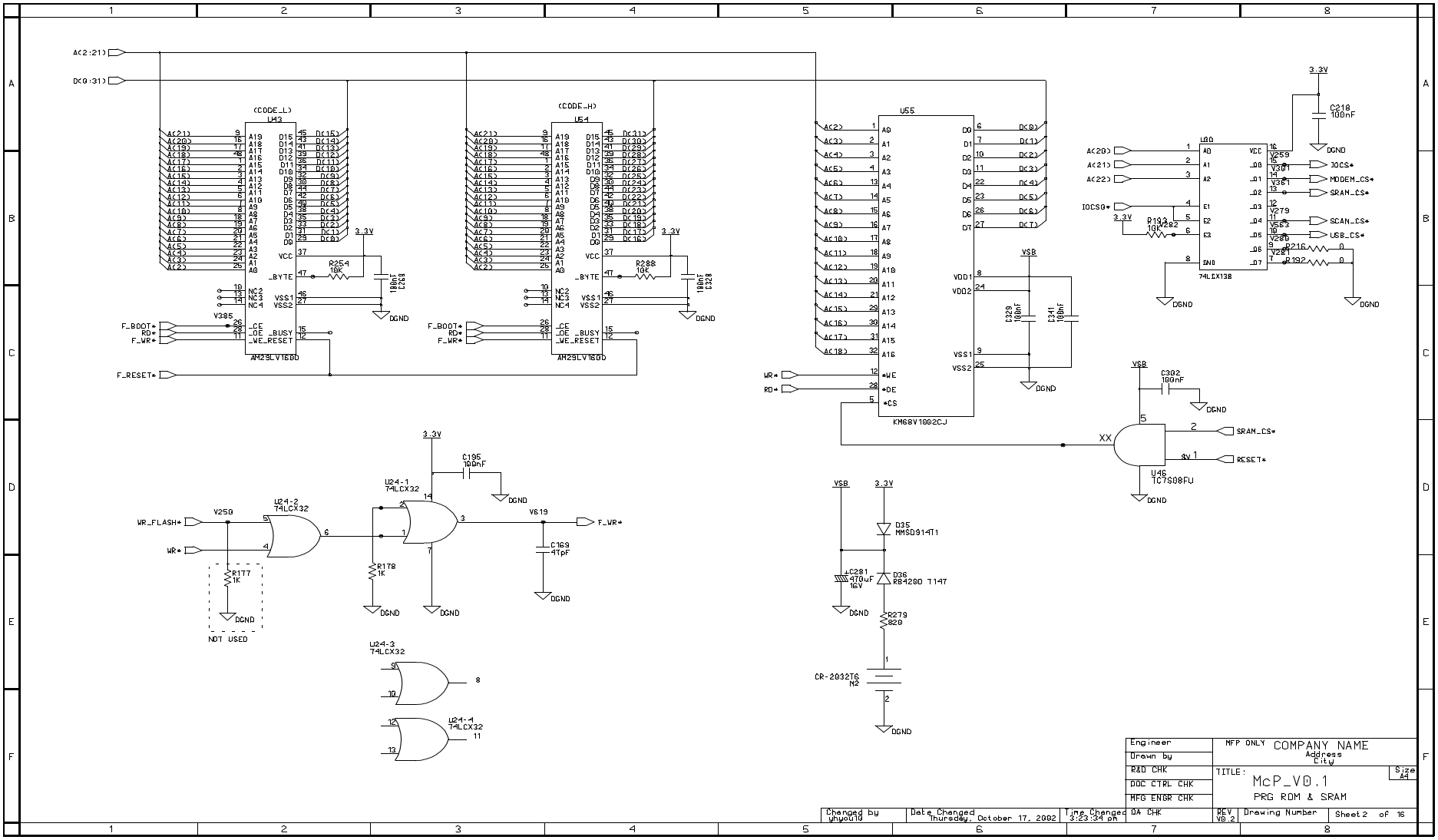
Main Circuit Diagram (2/16)



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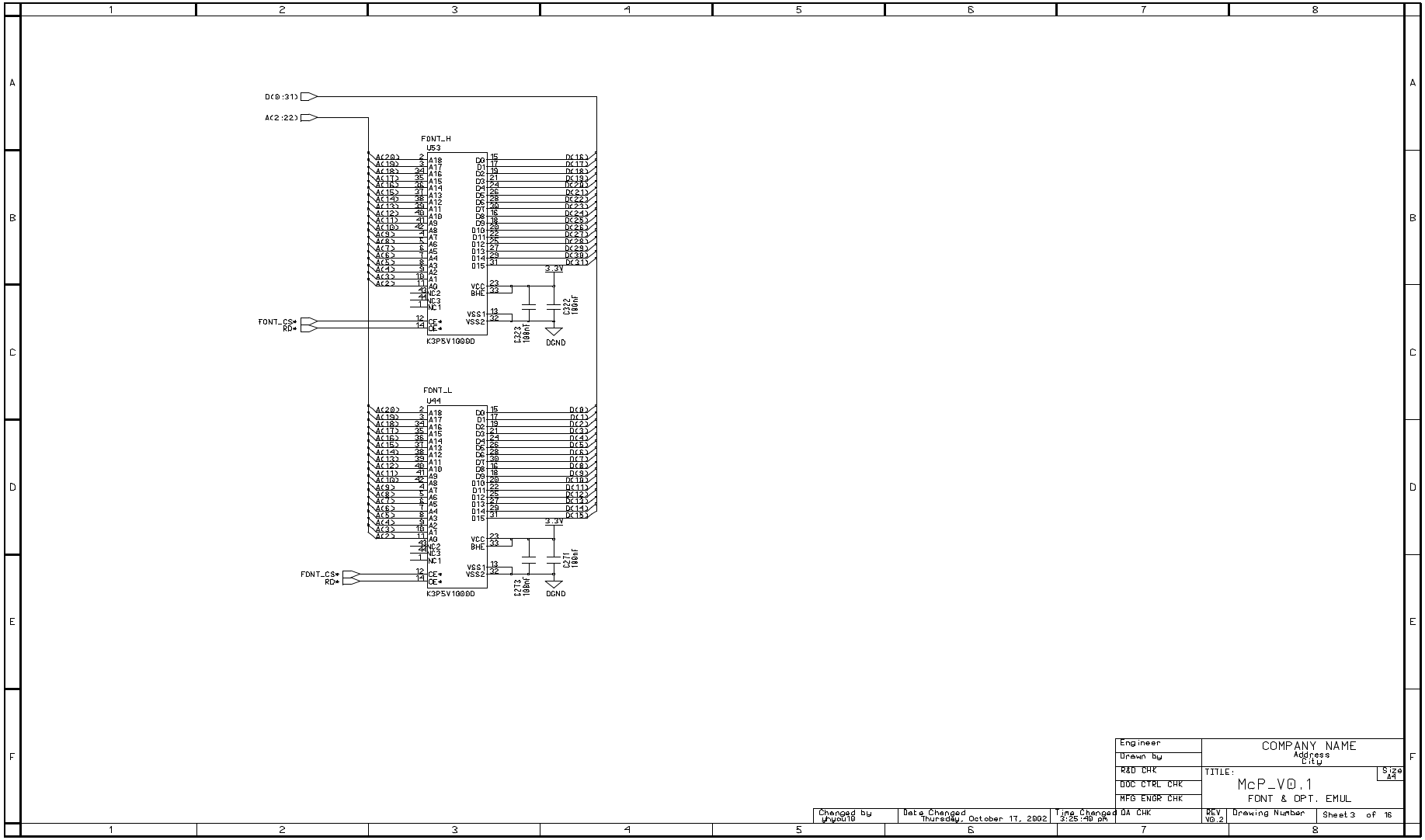
Main Circuit Diagram (3/16)



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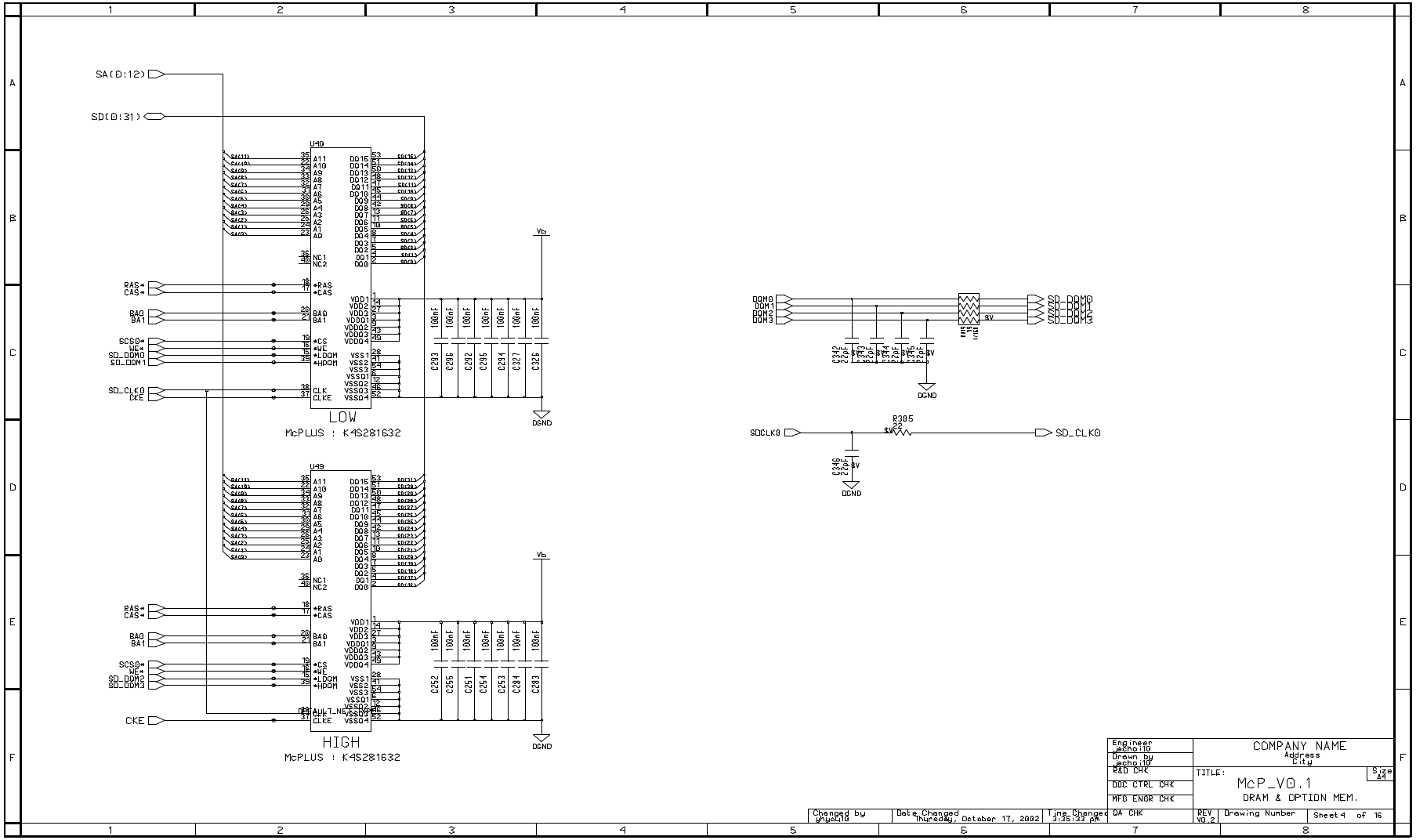
Main Circuit Diagram (4/16)



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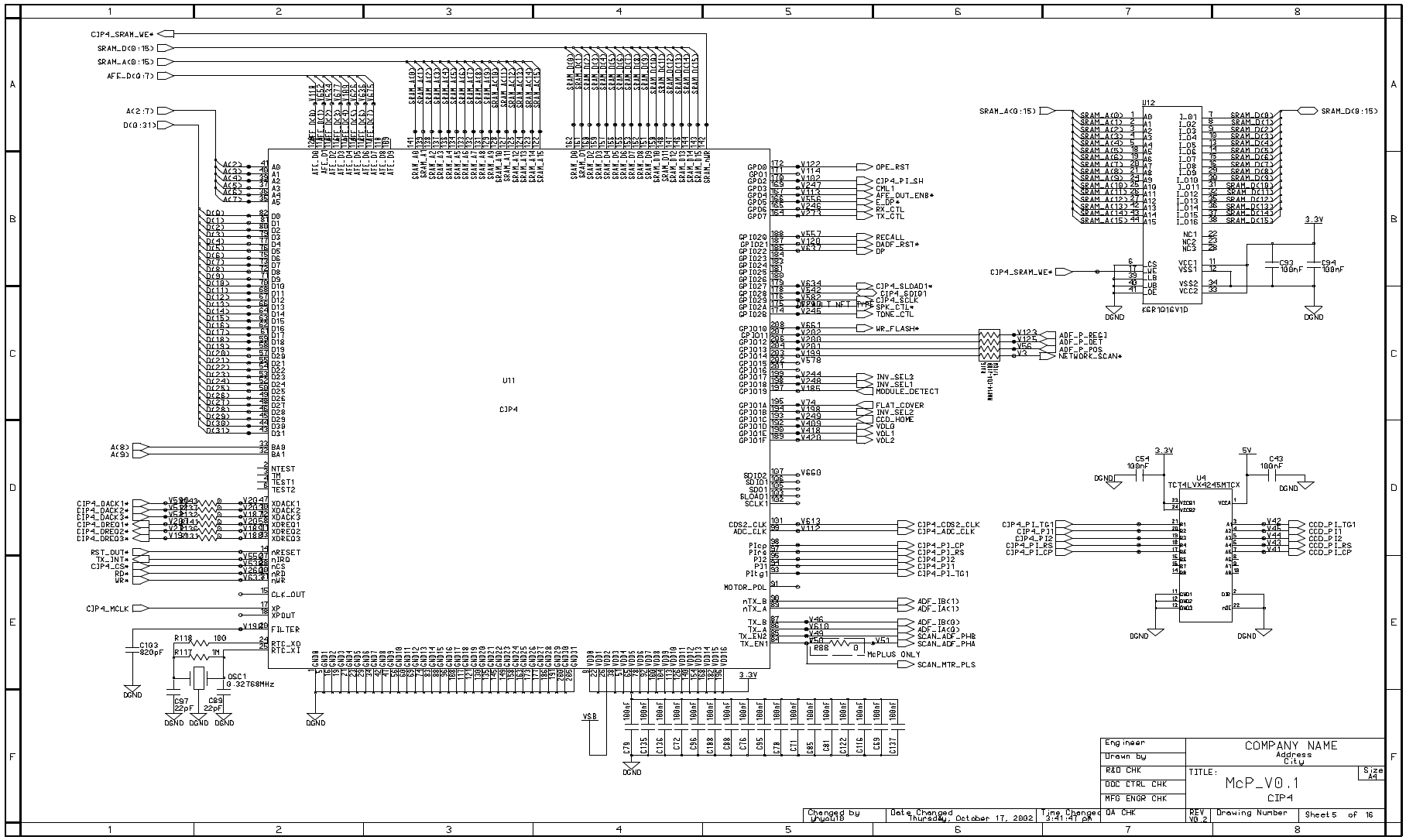
Main Circuit Diagram (5/16)



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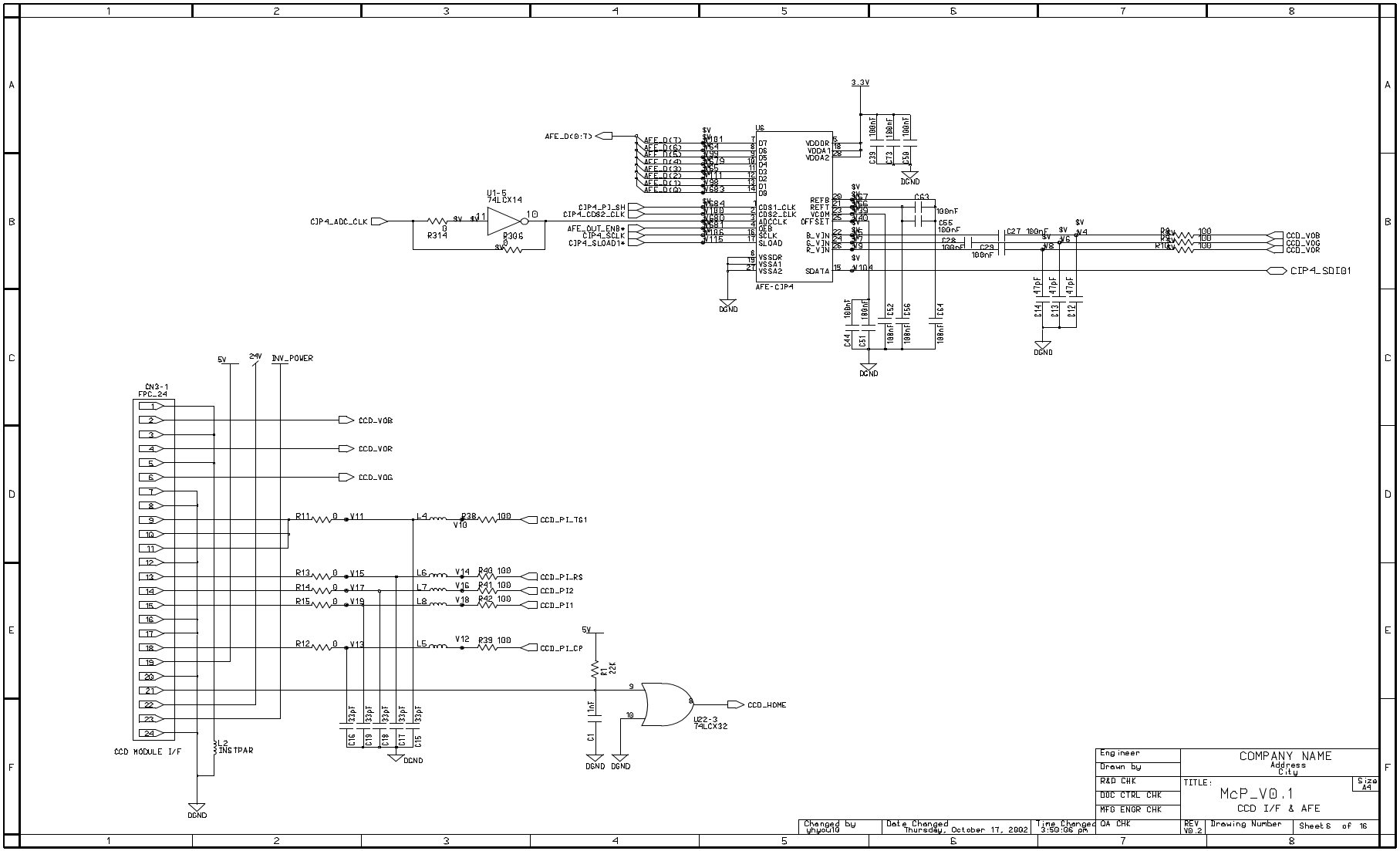
Main Circuit Diagram (6/16)



Engineer		COMPANY NAME	
Drawn by		Address	
R&D CHK		City	
DDC CTRL CHK		TITLE: MCP_V0.1 CCD I/F & AFE	Size A4
MFG ENGR CHK			
Changed by: yhyeo10	Date Changed: Thursday, October 17, 2002	Time Changed: 3:50:06 pm	OA CHK
REV: V0.2	Drawing Number	Sheet 6 of 16	

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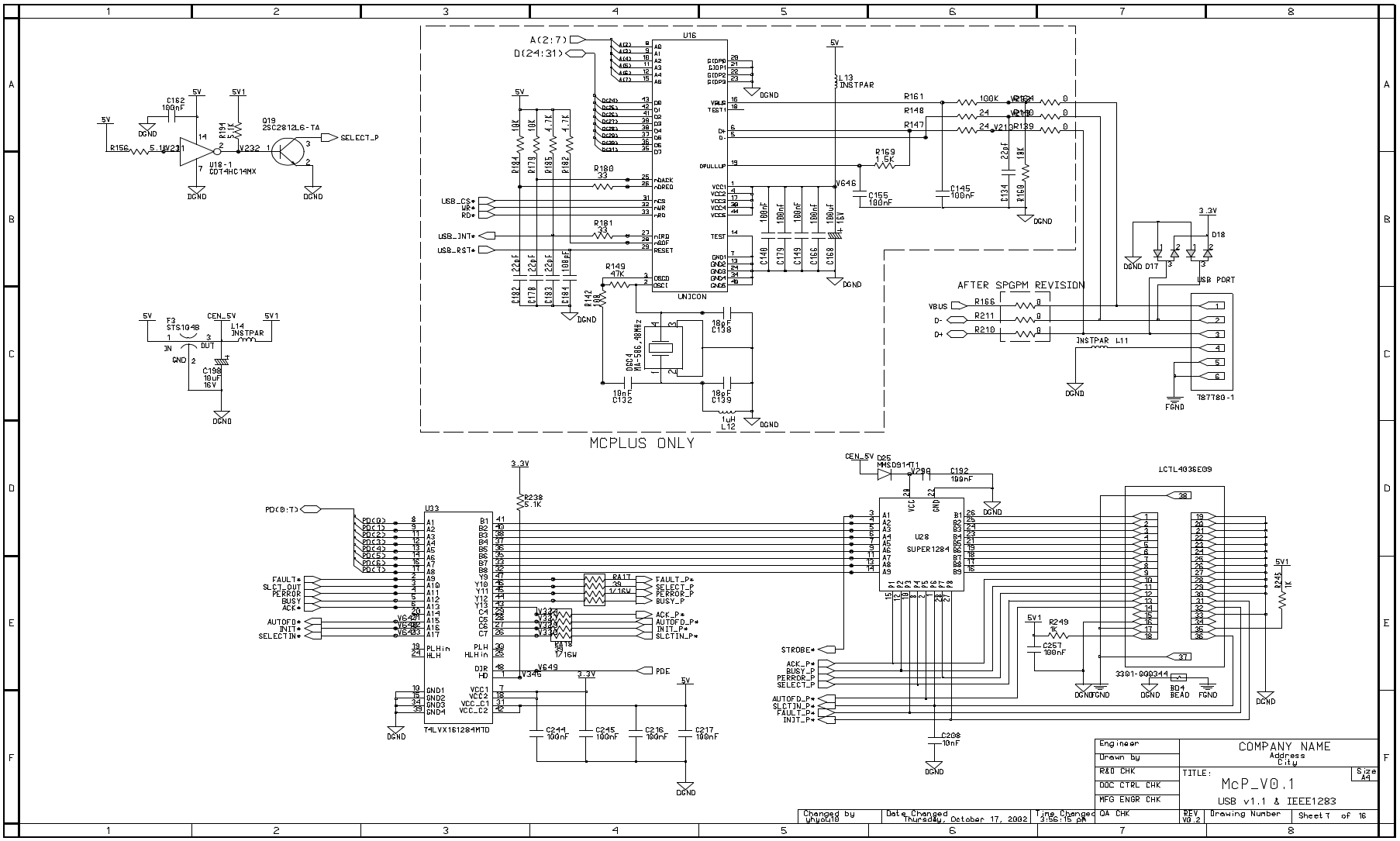
Main Circuit Diagram (7/16)



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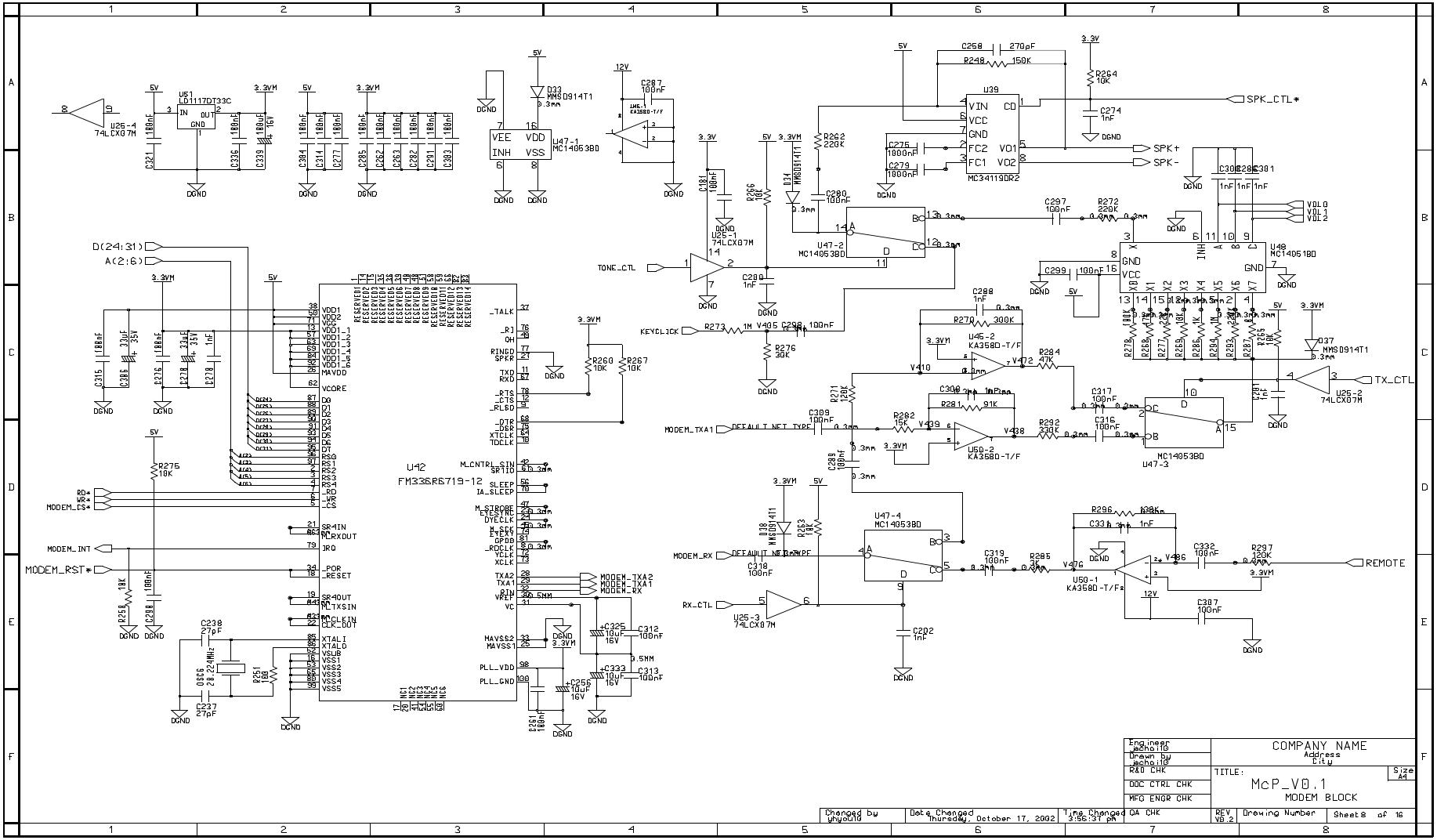
Main Circuit Diagram (8/16)



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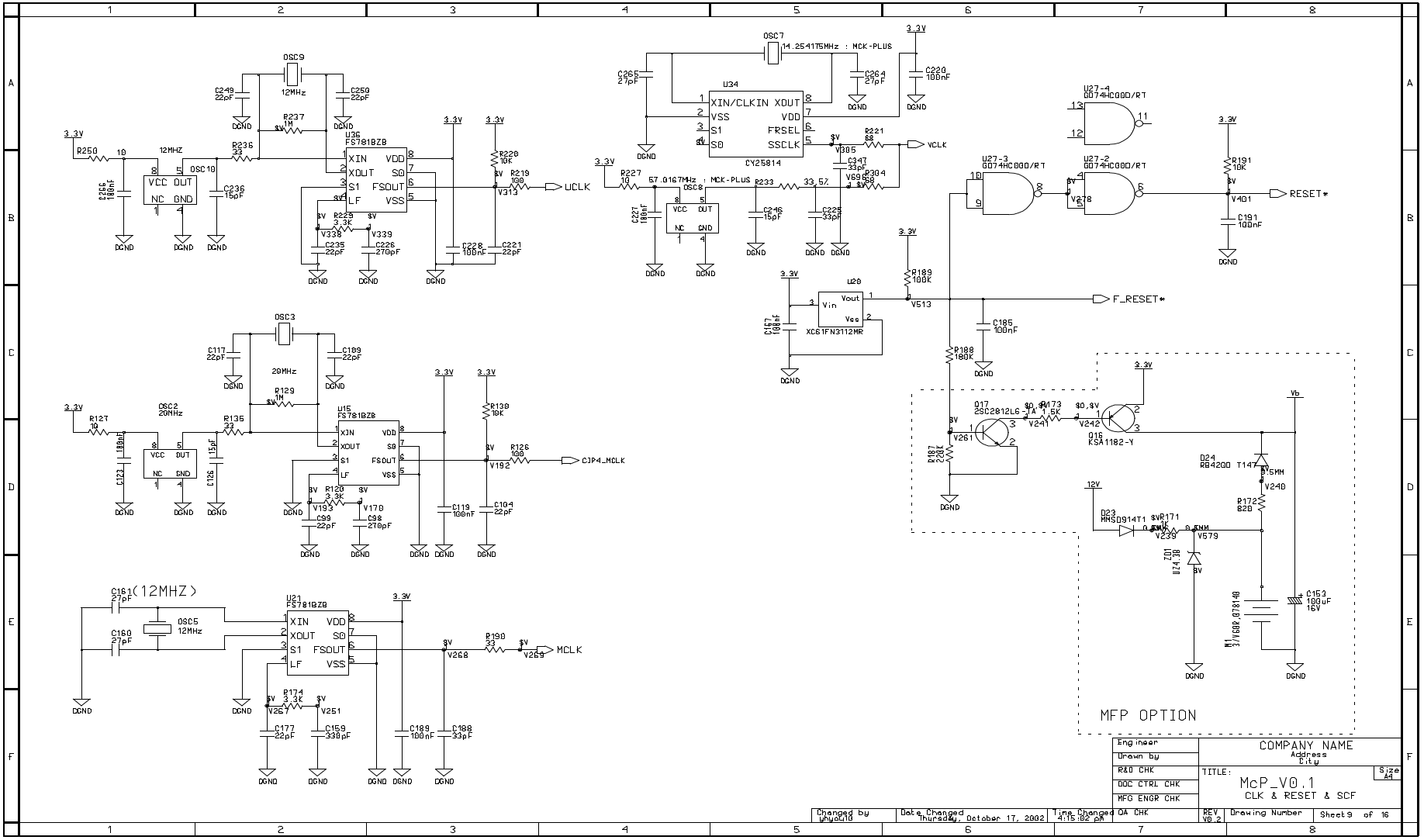
Main Circuit Diagram (9/16)



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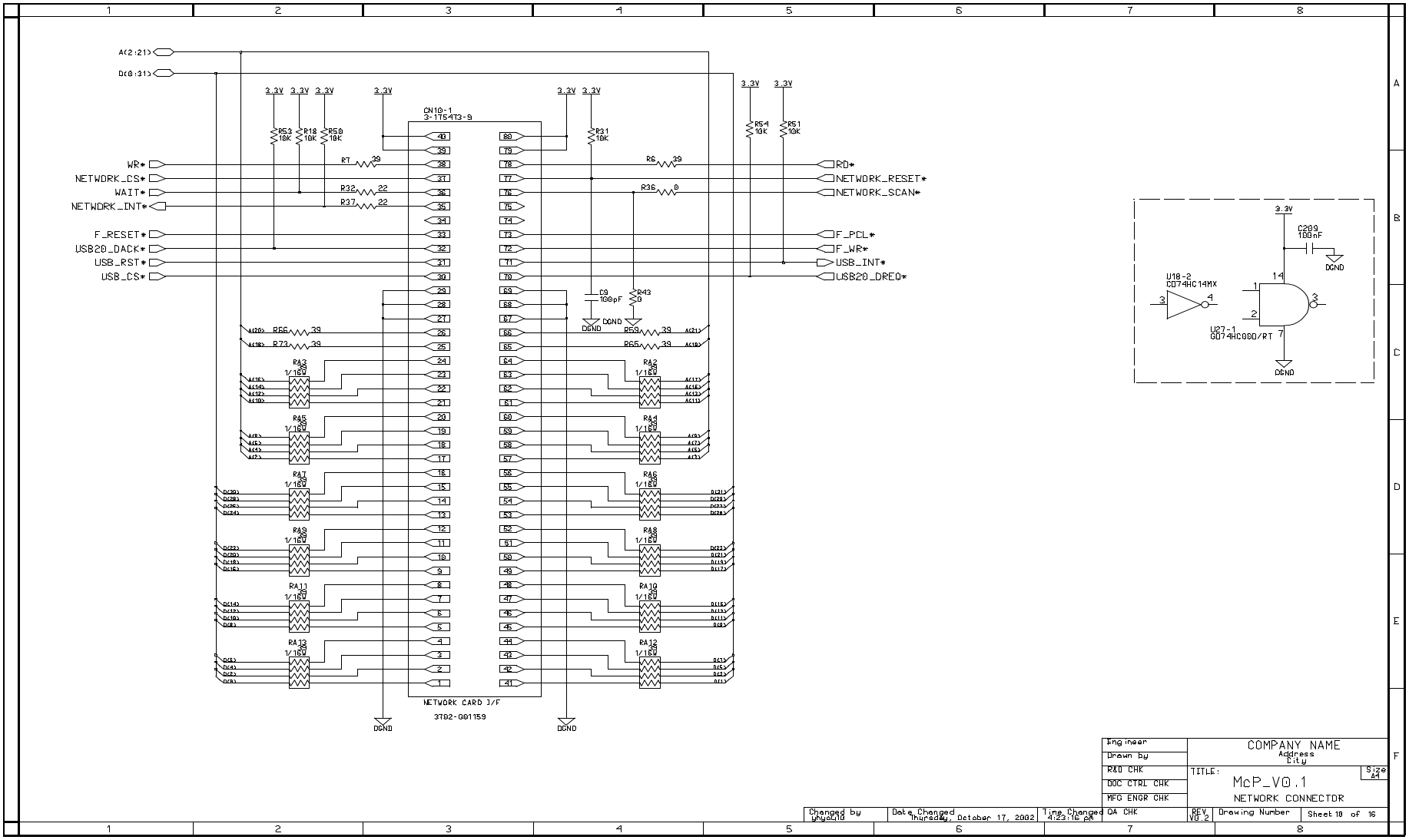
Main Circuit Diagram (10/16)



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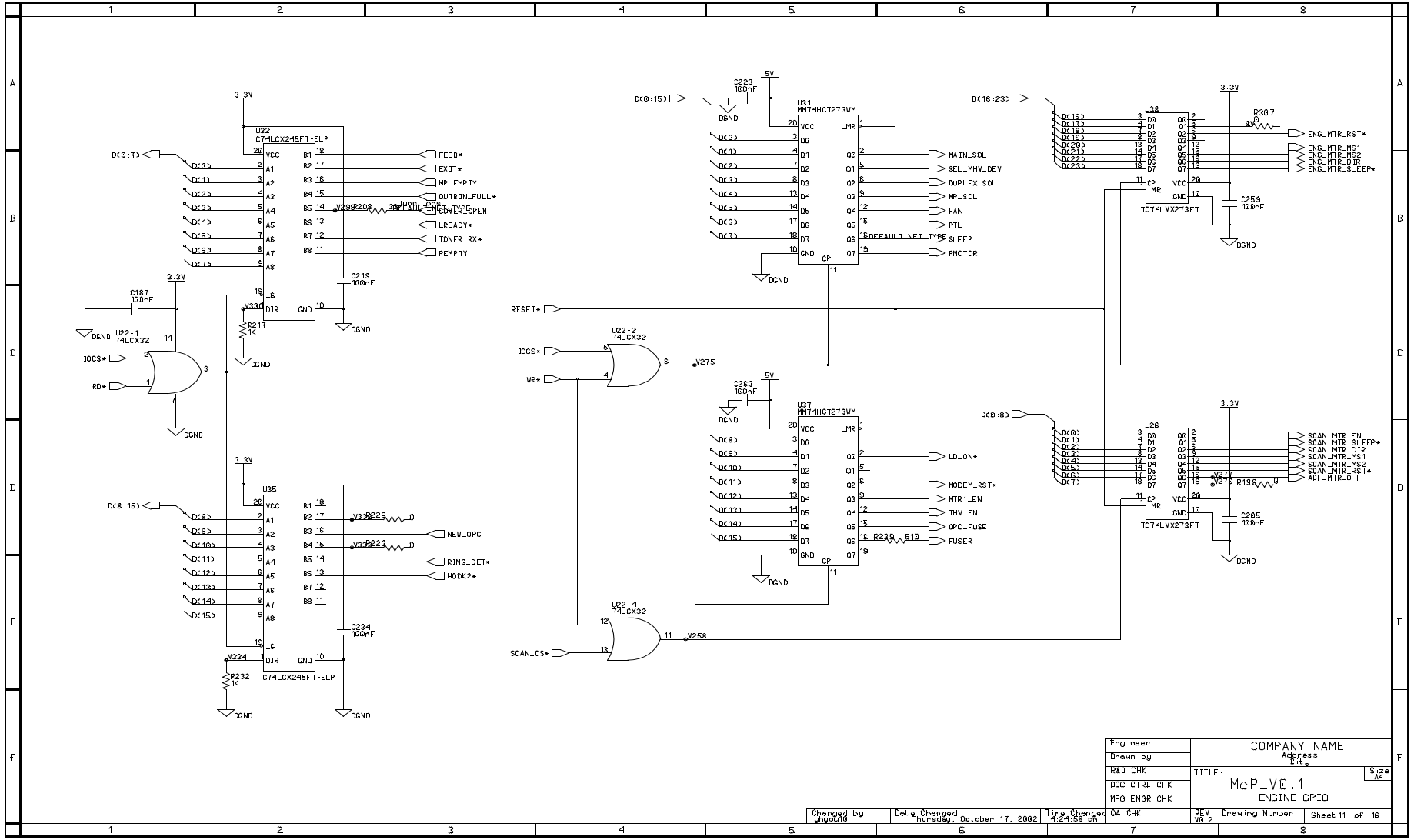
Main Circuit Diagram (11/16)



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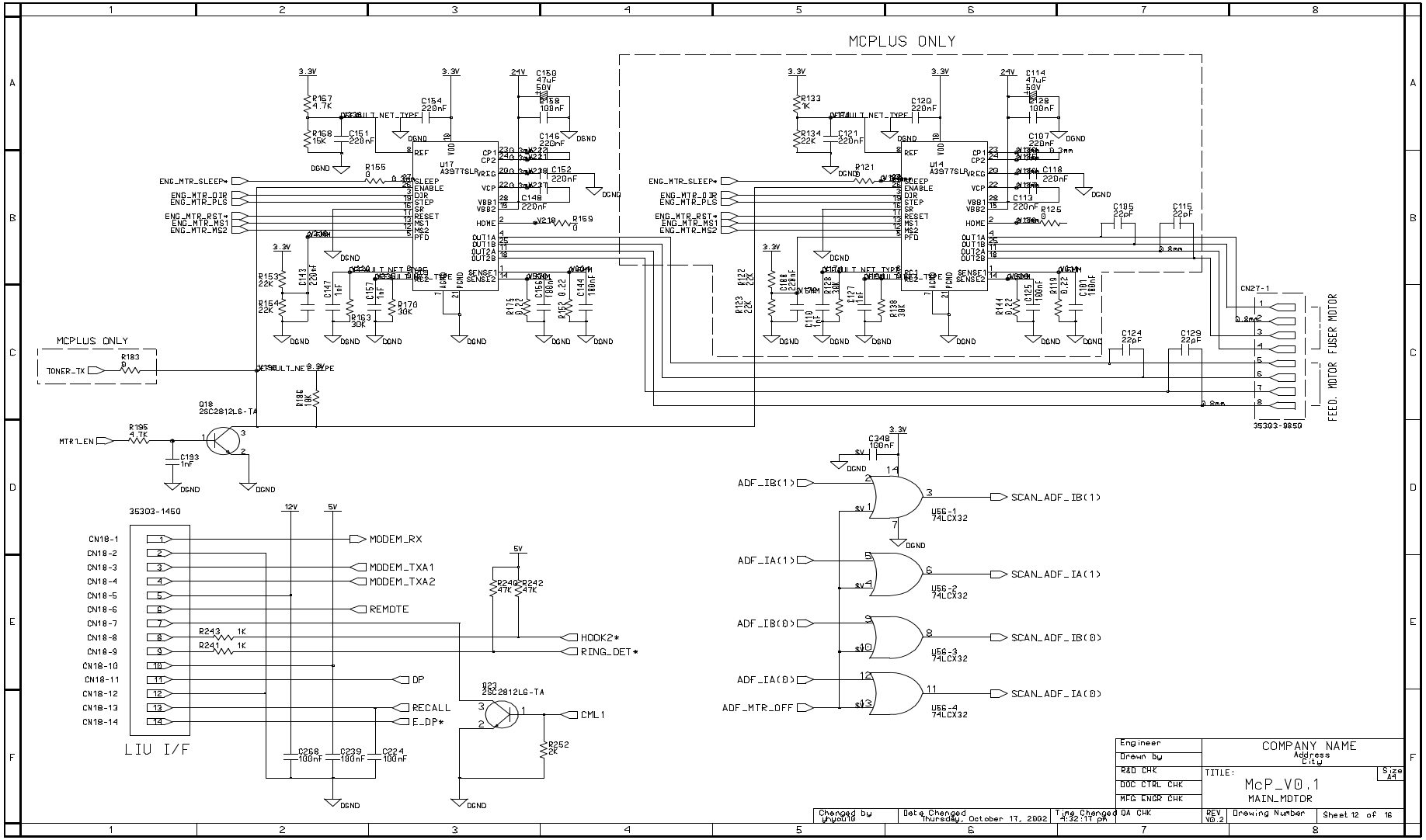
Main Circuit Diagram (12/16)



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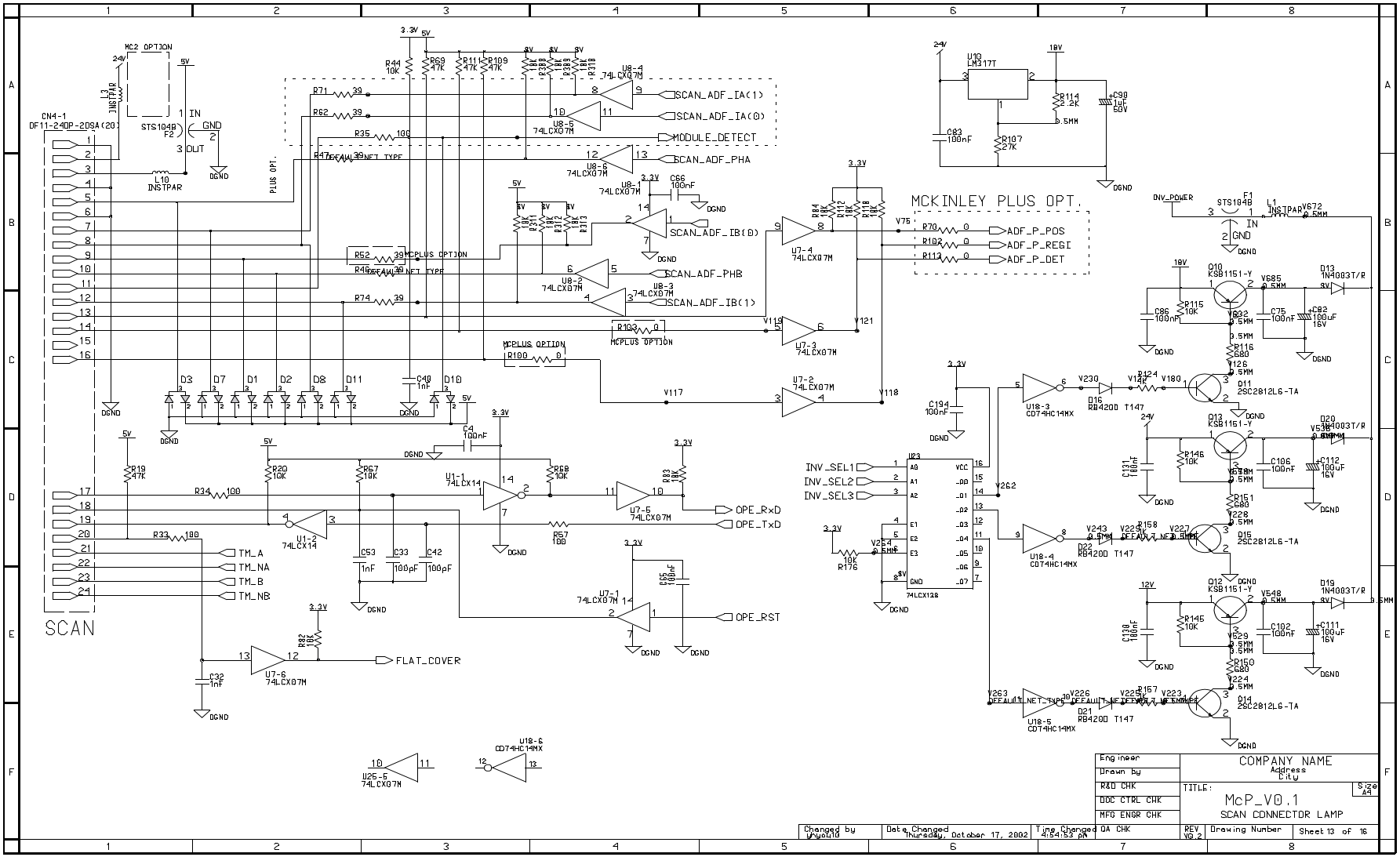
Main Circuit Diagram (13/16)



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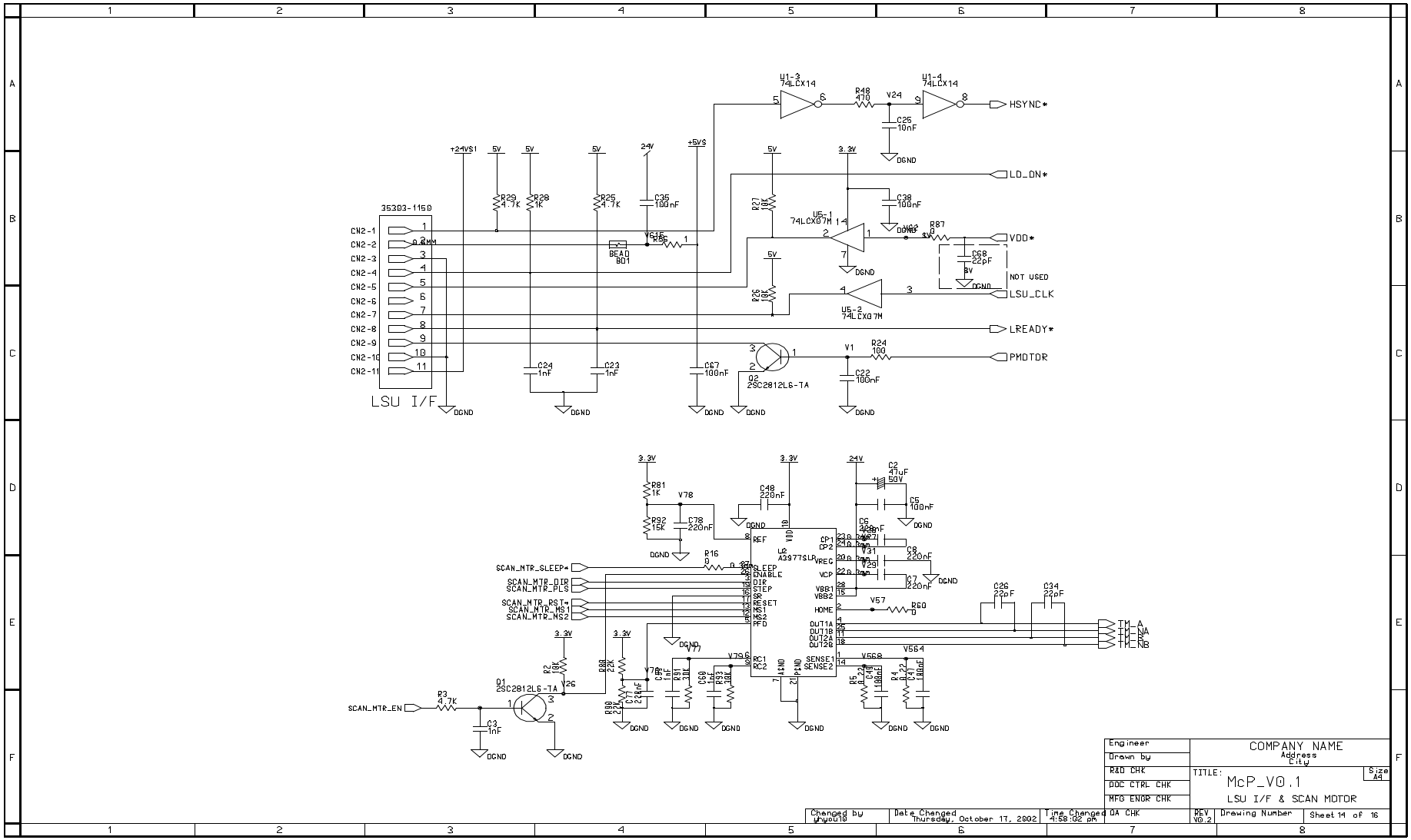
Main Circuit Diagram (14/16)



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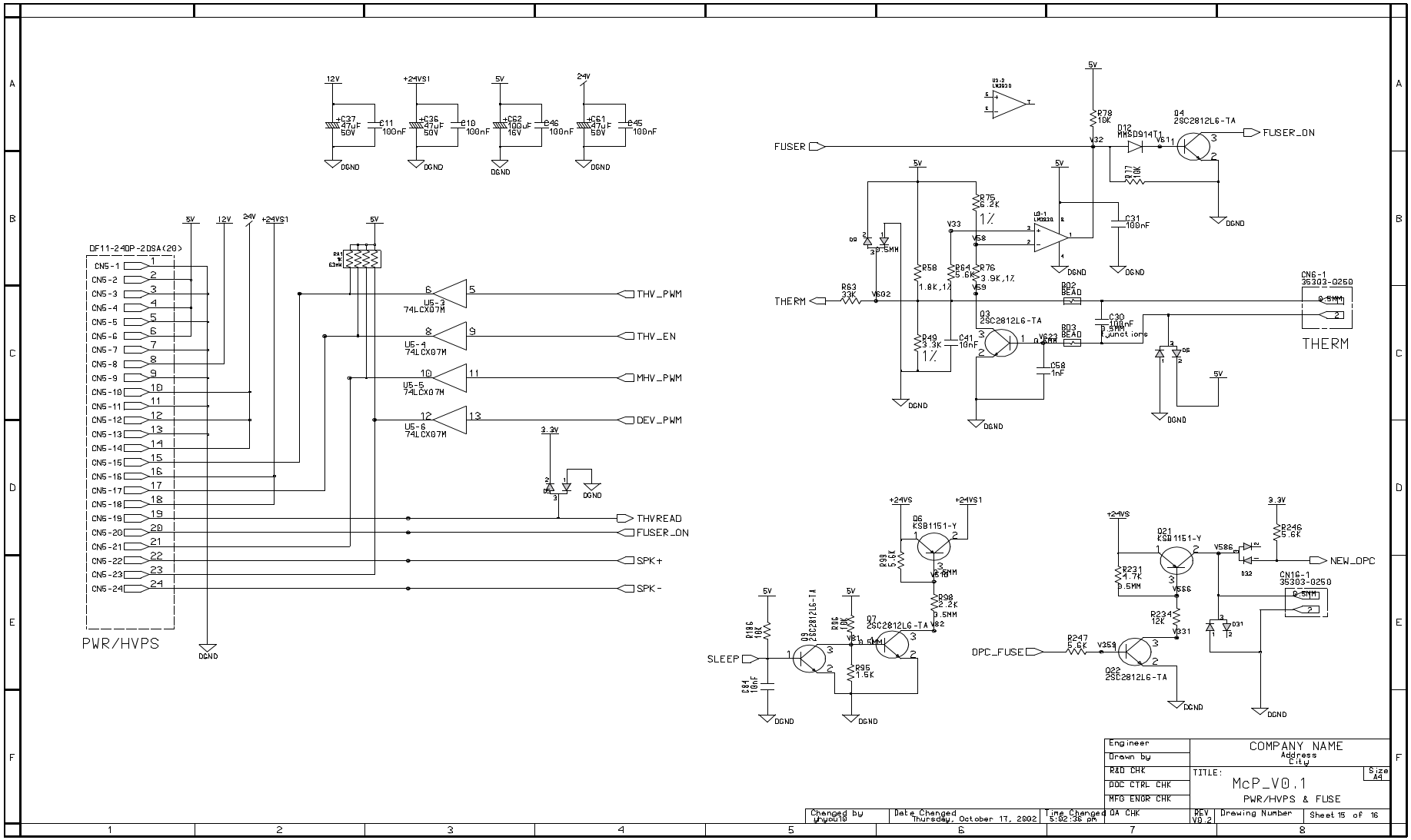
Main Circuit Diagram (15/16)



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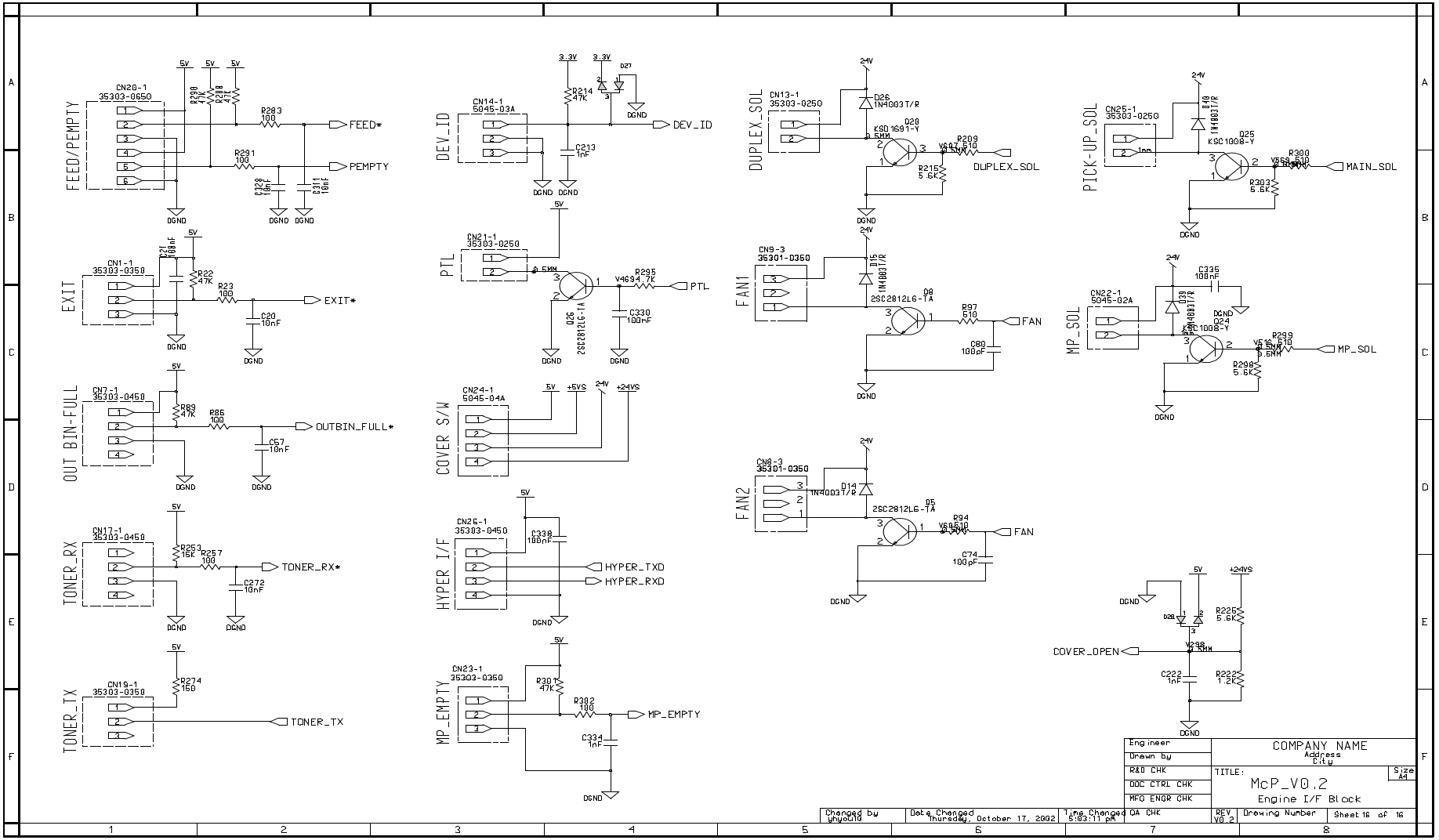
Main Circuit Diagram (16/16)



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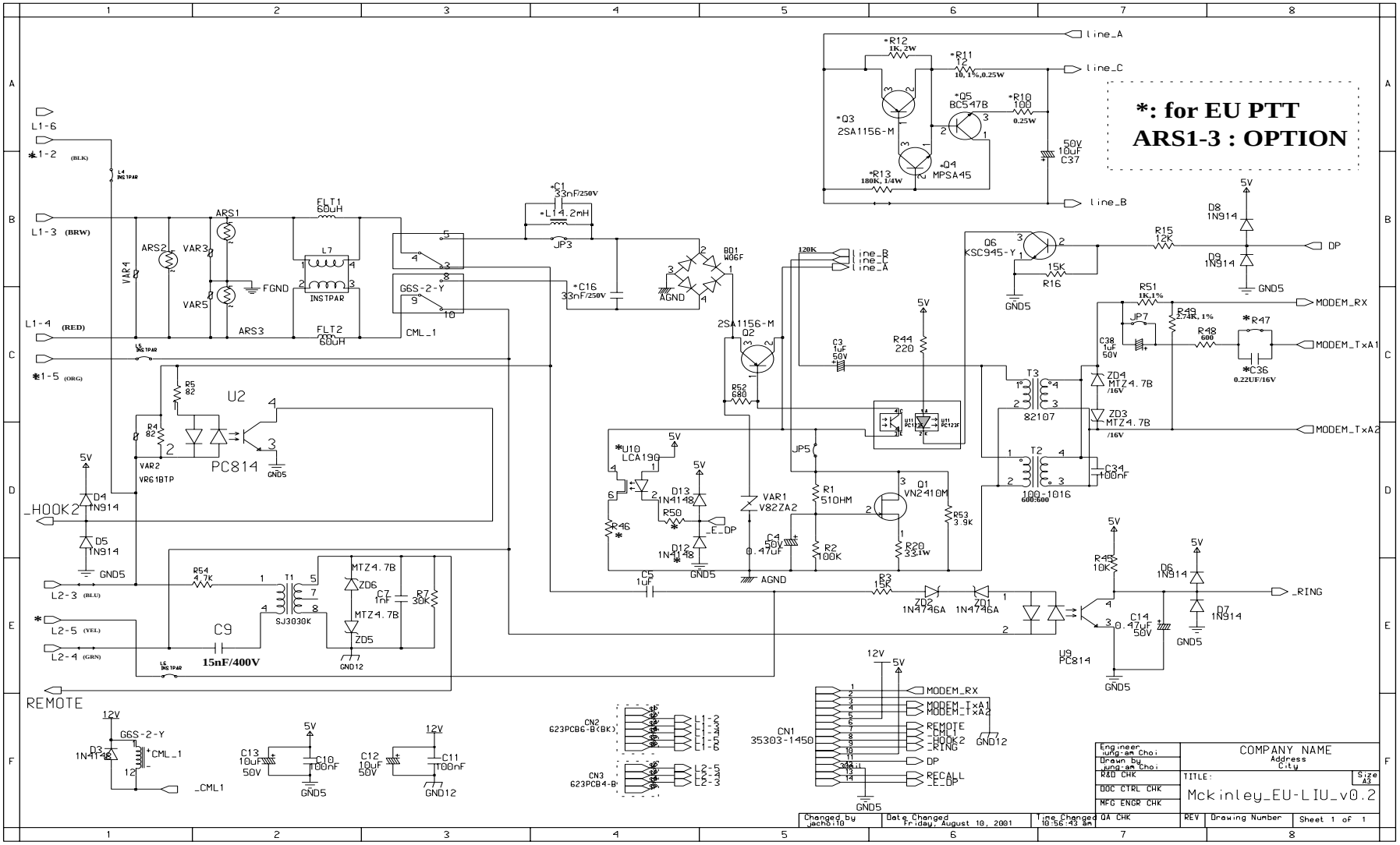
4-2 LIU Circuit Diagram



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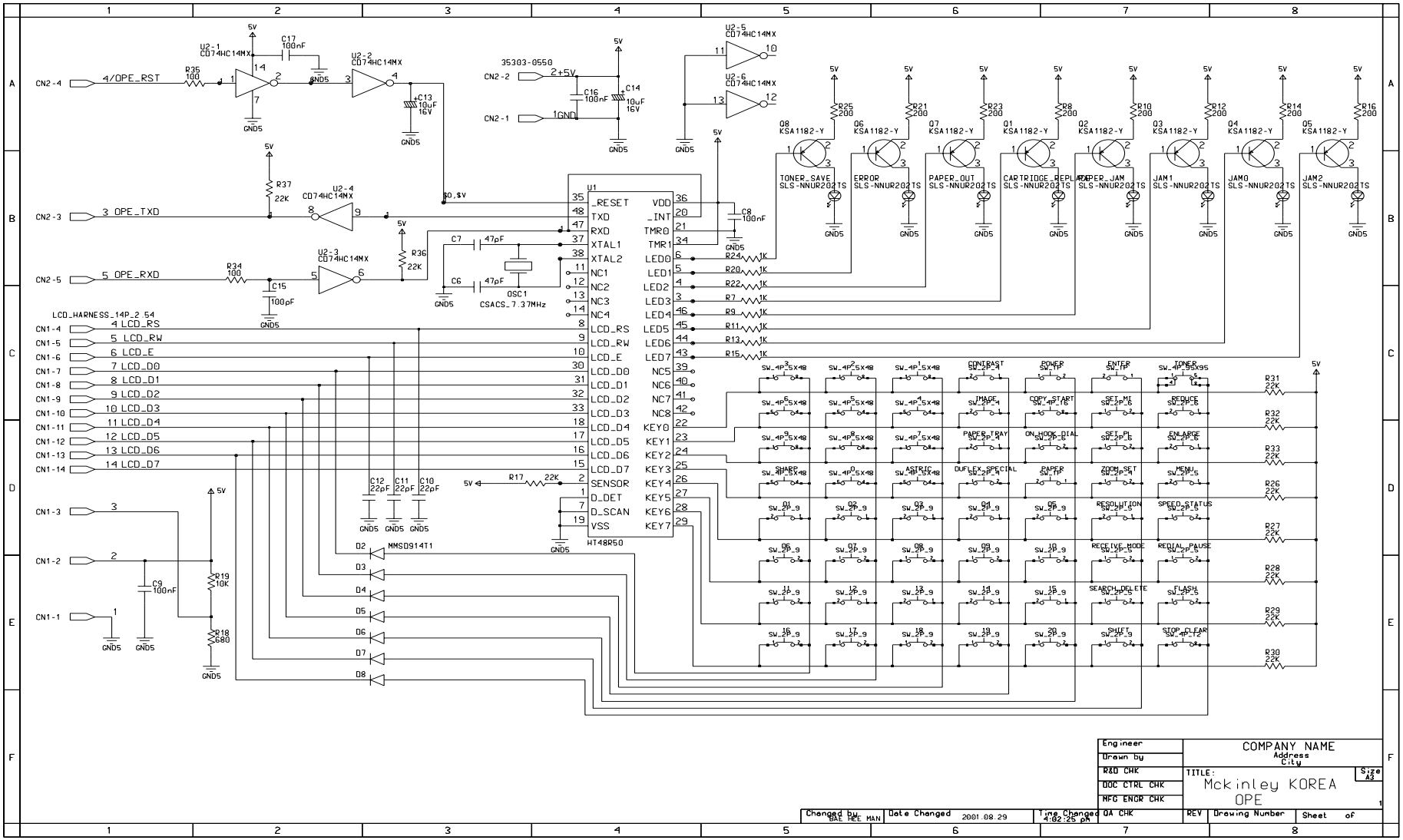
4-3 OPE Circuit Diagram



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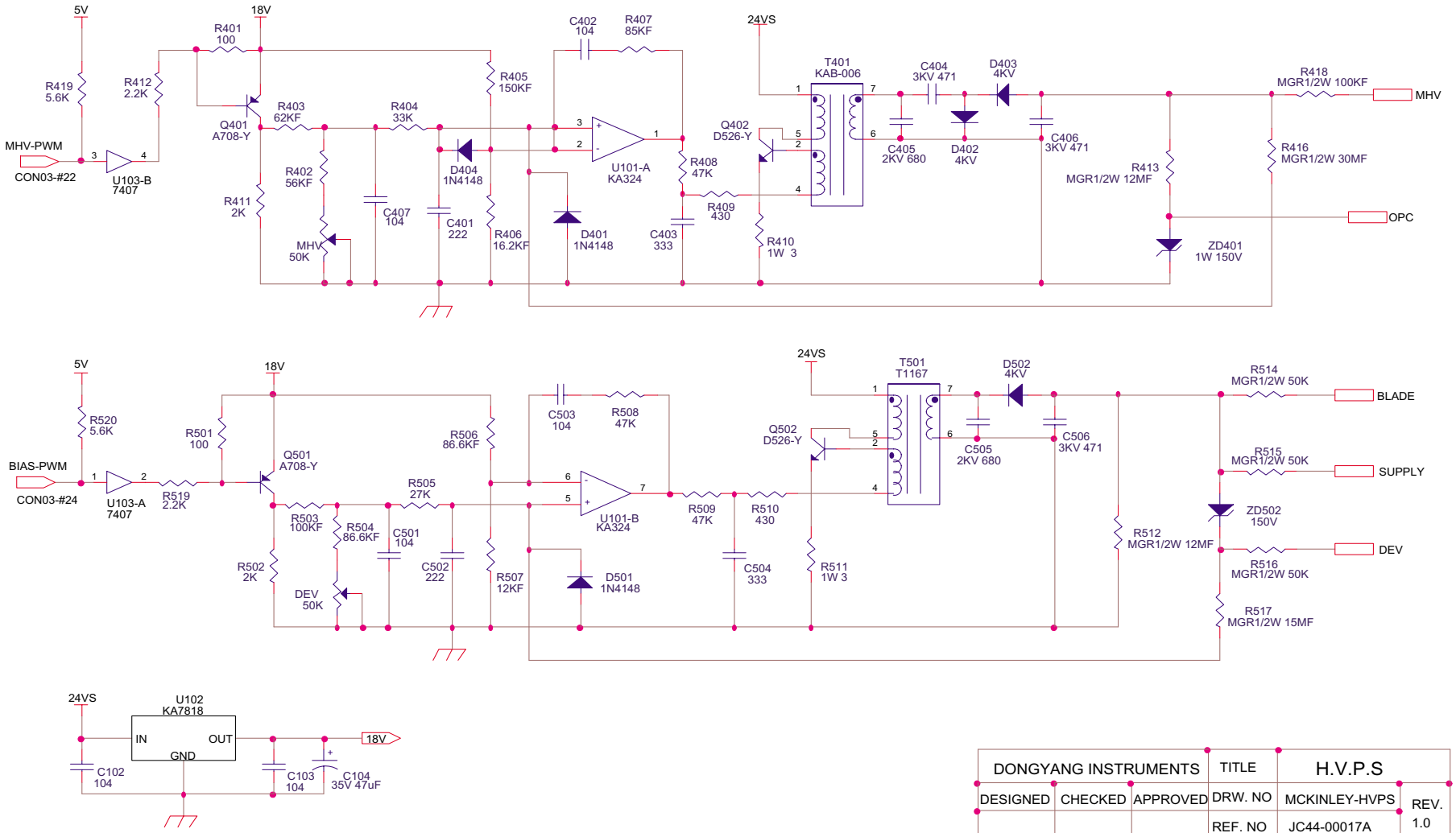
4-4 HVPS Circuit Diagram (1/2)



DONGYANG INSTRUMENTS			TITLE	H.V.P.S	
DESIGNED	CHECKED	APPROVED	DRW. NO	MCKINLEY-HVPS	REV. 1.0
J.S.YOUN			REF. NO	JC44-00017A	
			SIZE A4	DATE 01/05/20	1 OF 2

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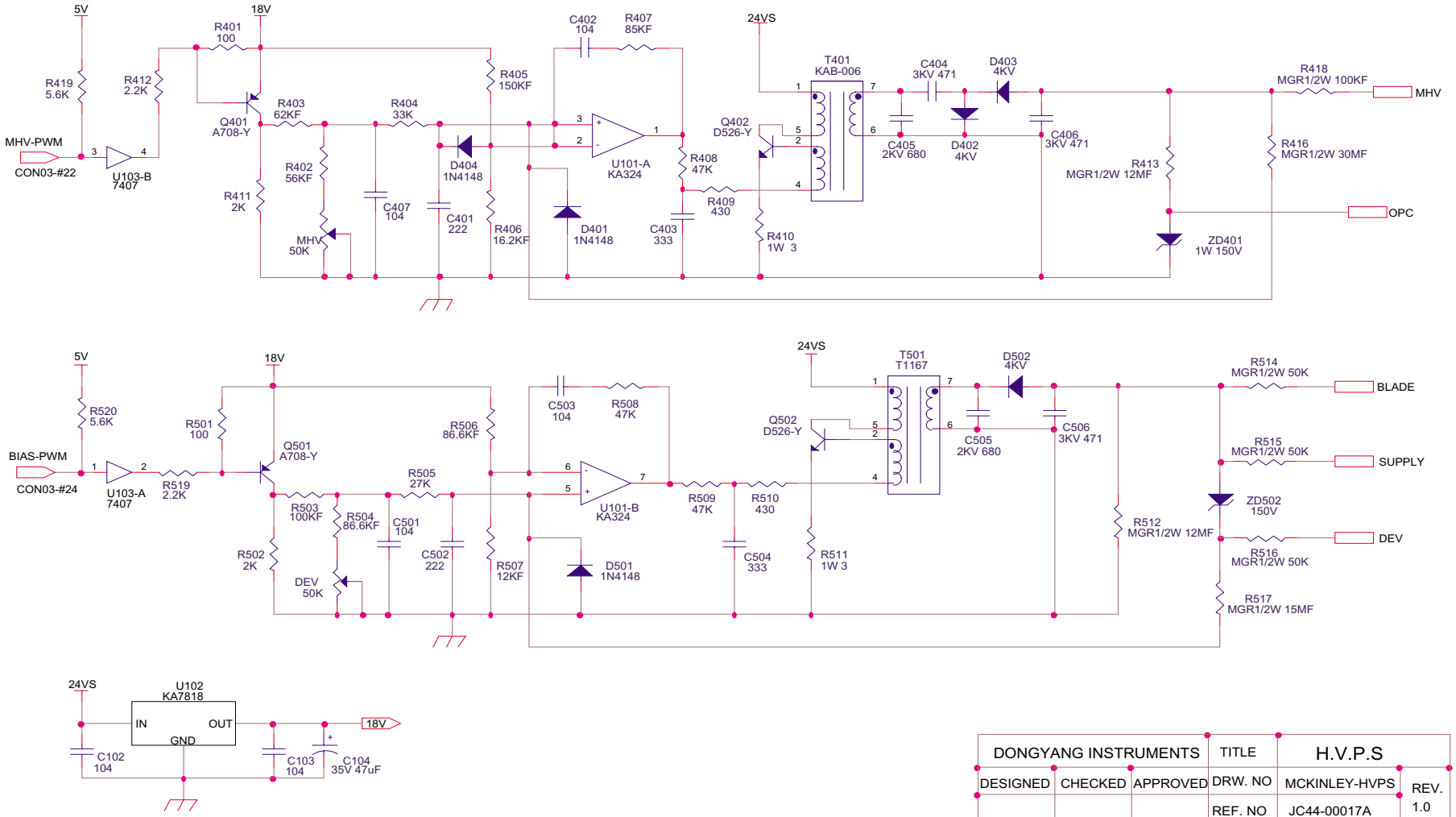
HVPS Circuit Diagram (2/2)



DONGYANG INSTRUMENTS			TITLE	H.V.P.S	
DESIGNED	CHECKED	APPROVED	DRW. NO	MCKINLEY-HVPS	REV. 1.0
J.S.YOUN			REF. NO	JC44-00017A	
			SIZE A4	DATE 01/05/20	1 OF 2

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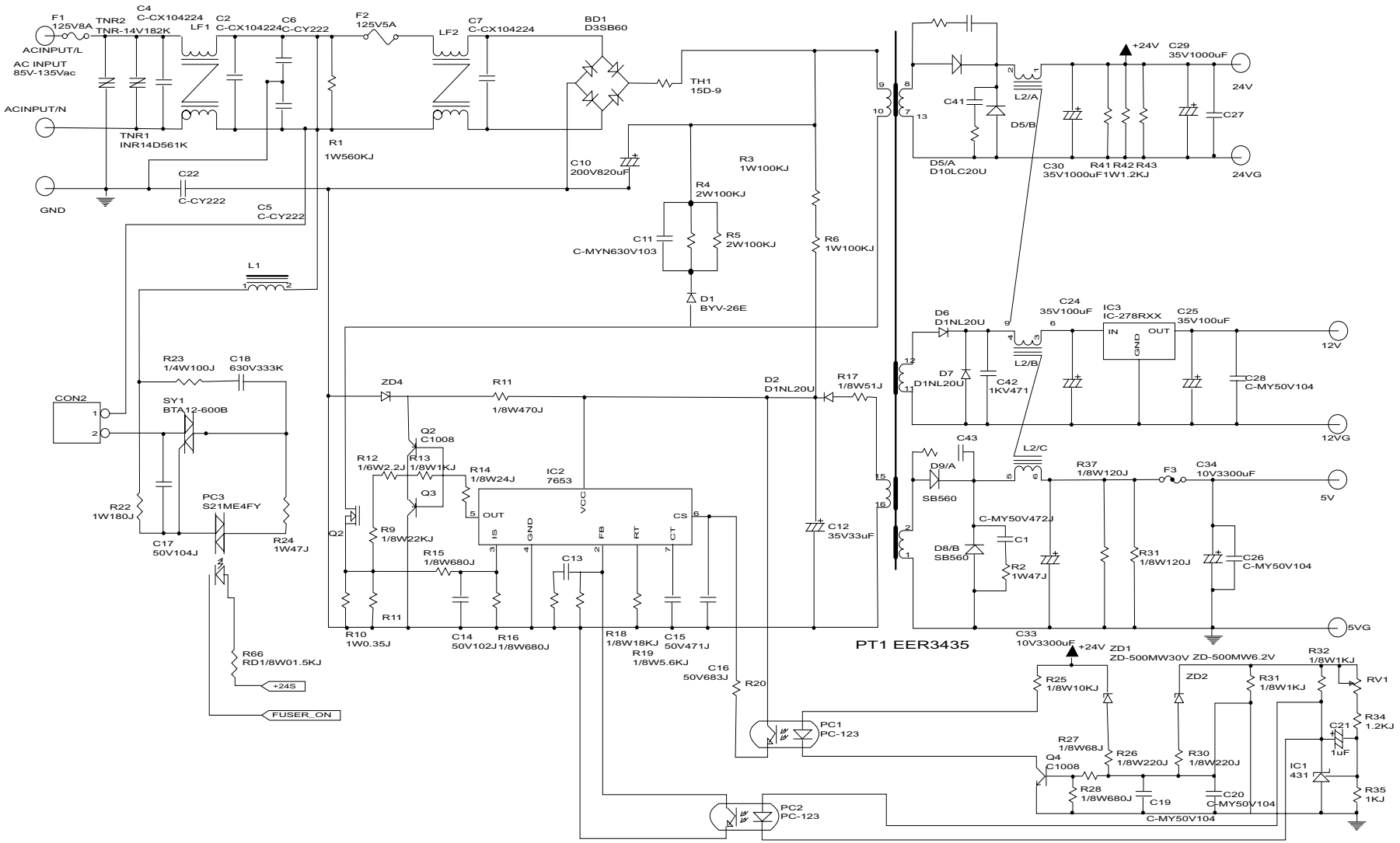
4-5 SMPS Circuit Diagram (110V)



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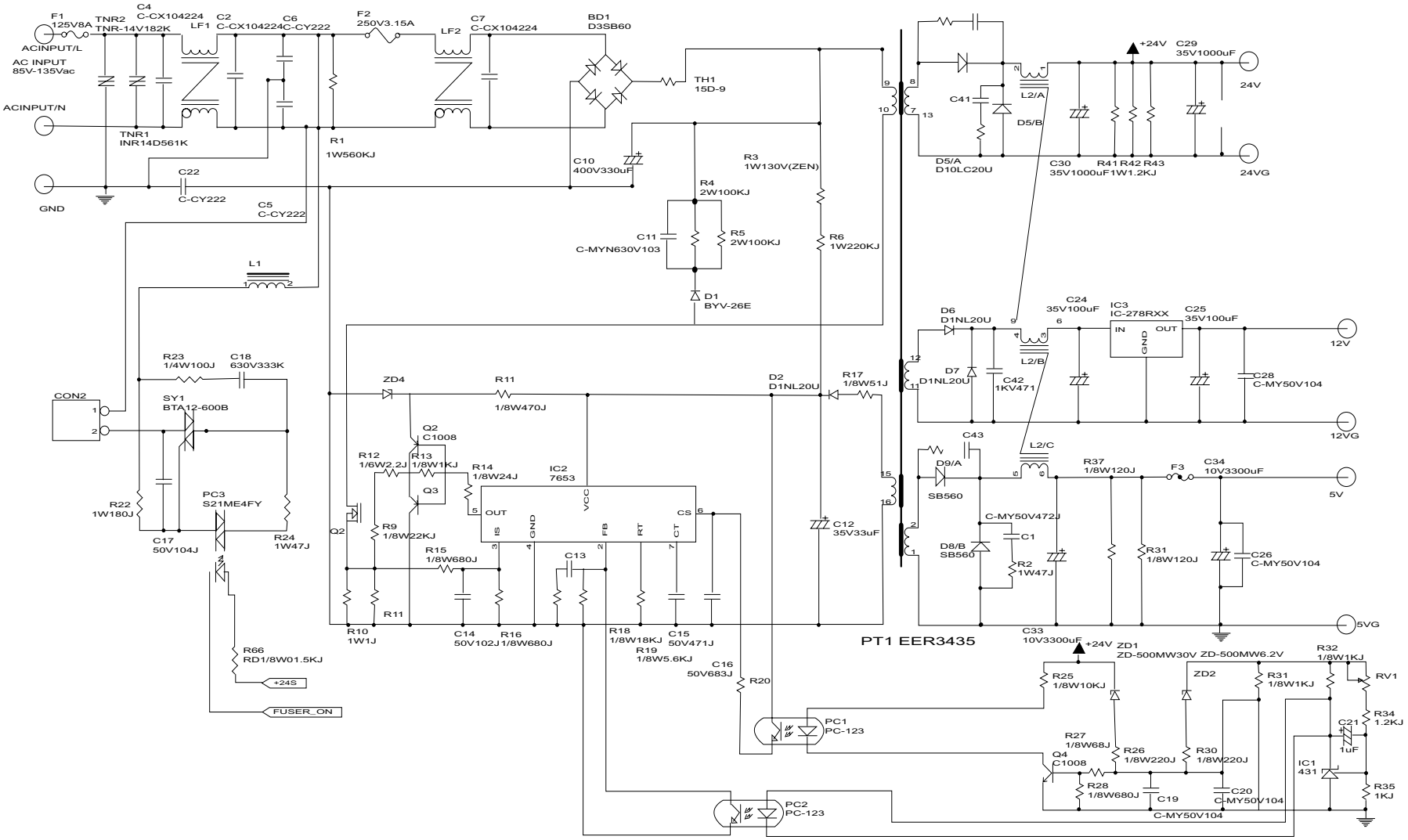
SMPS Circuit Diagram (220V)



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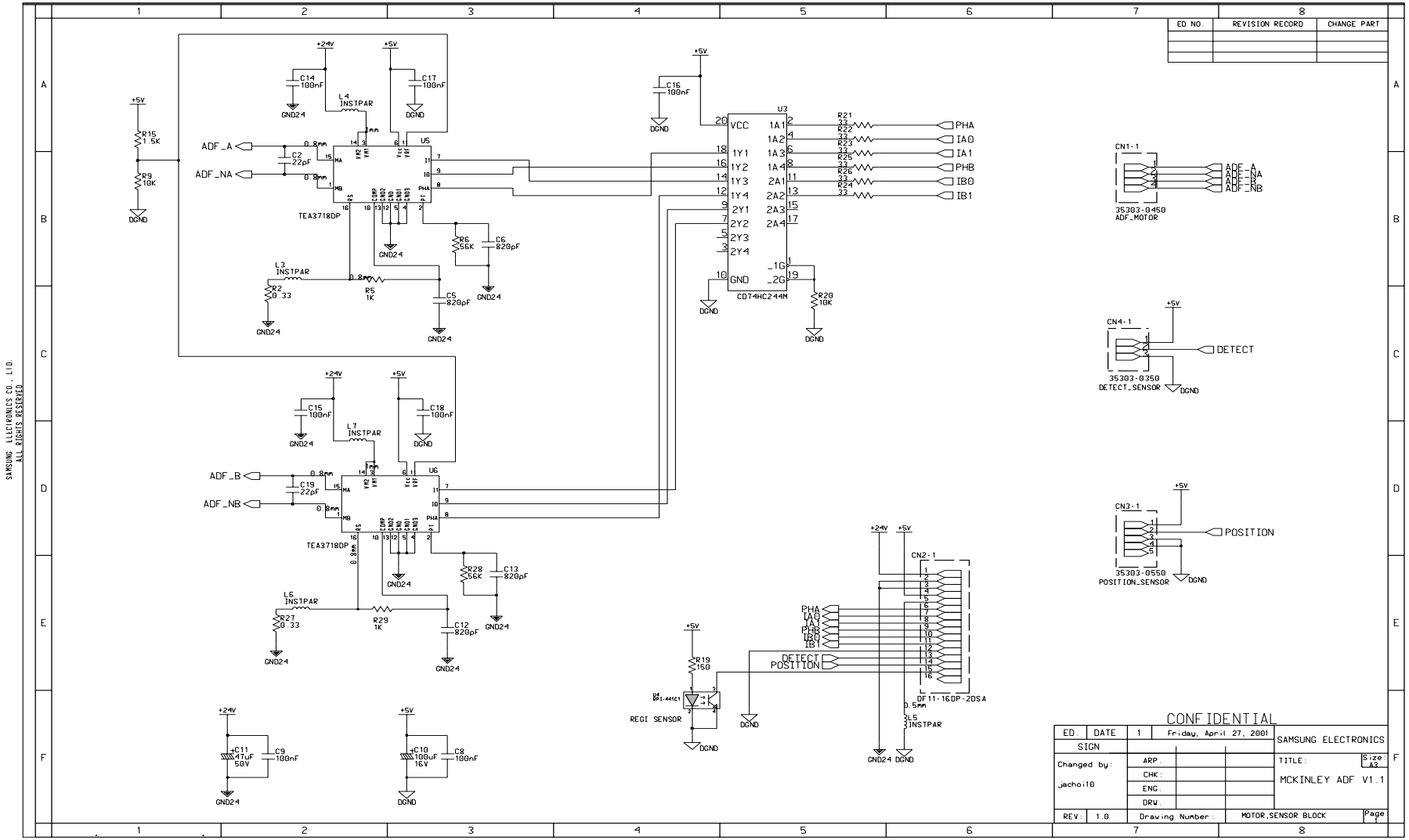
4-6 ADF Circuit Diagram



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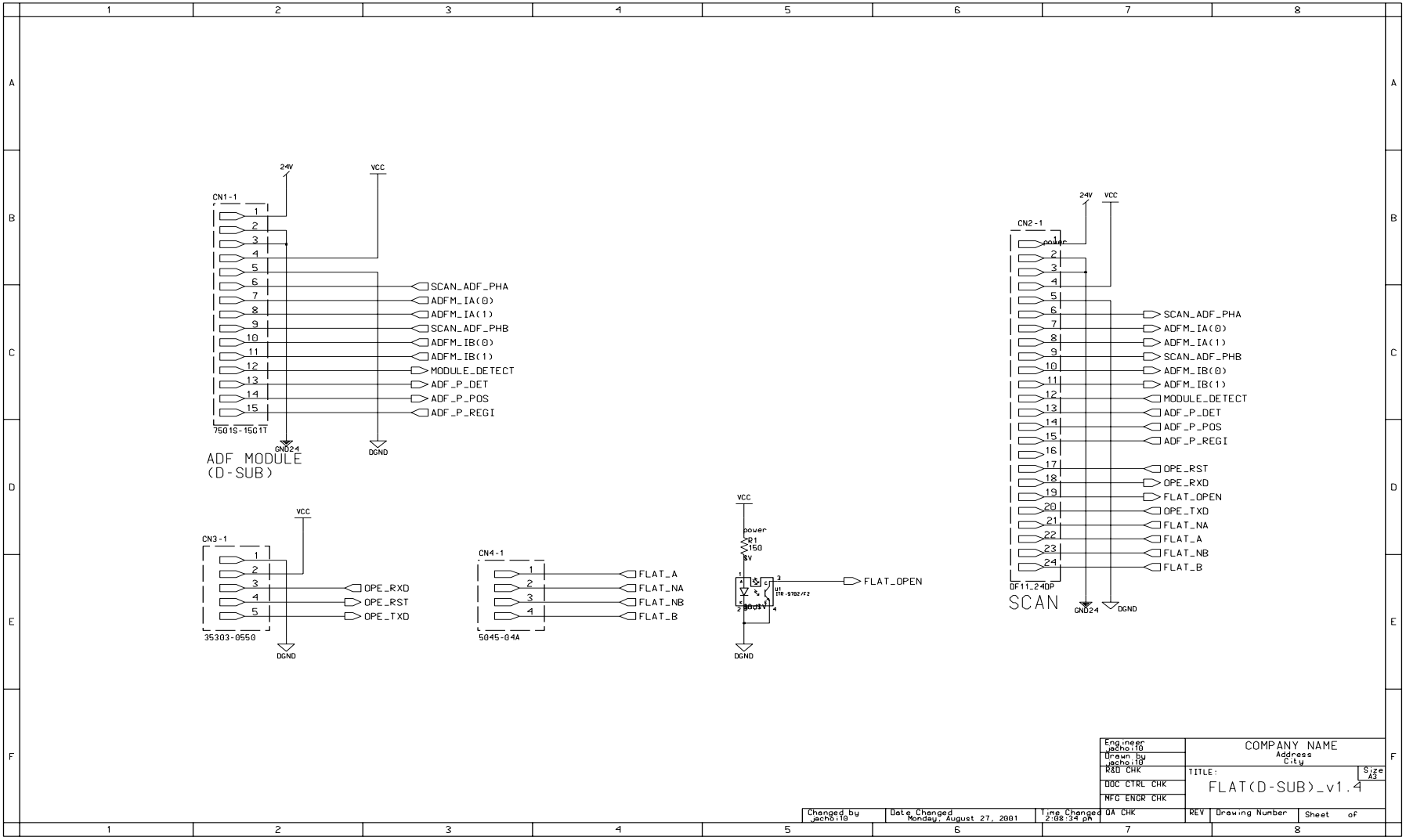
4-7 Flat Circuit Diagram



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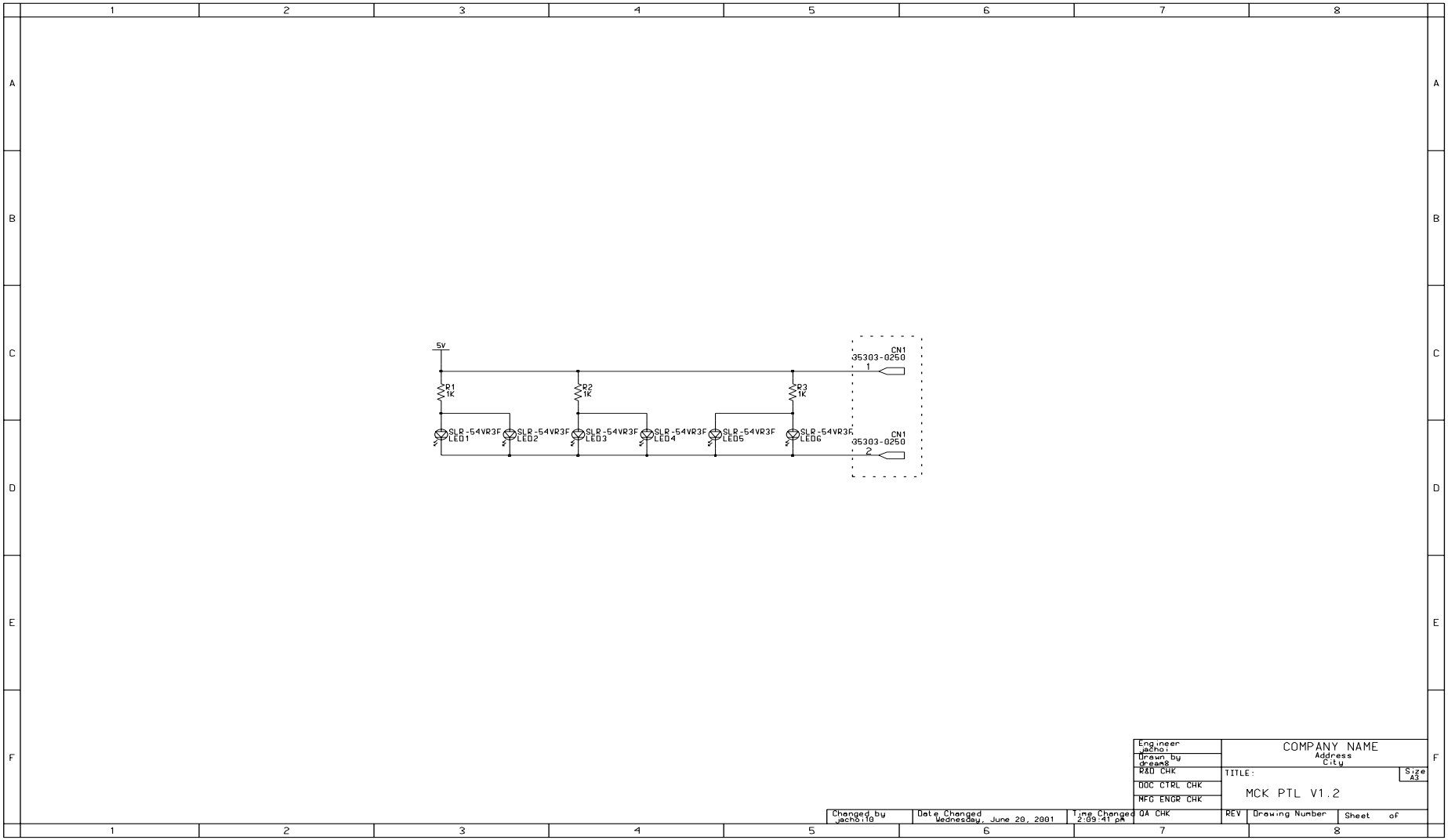
4-8 PTL Circuit Diagram



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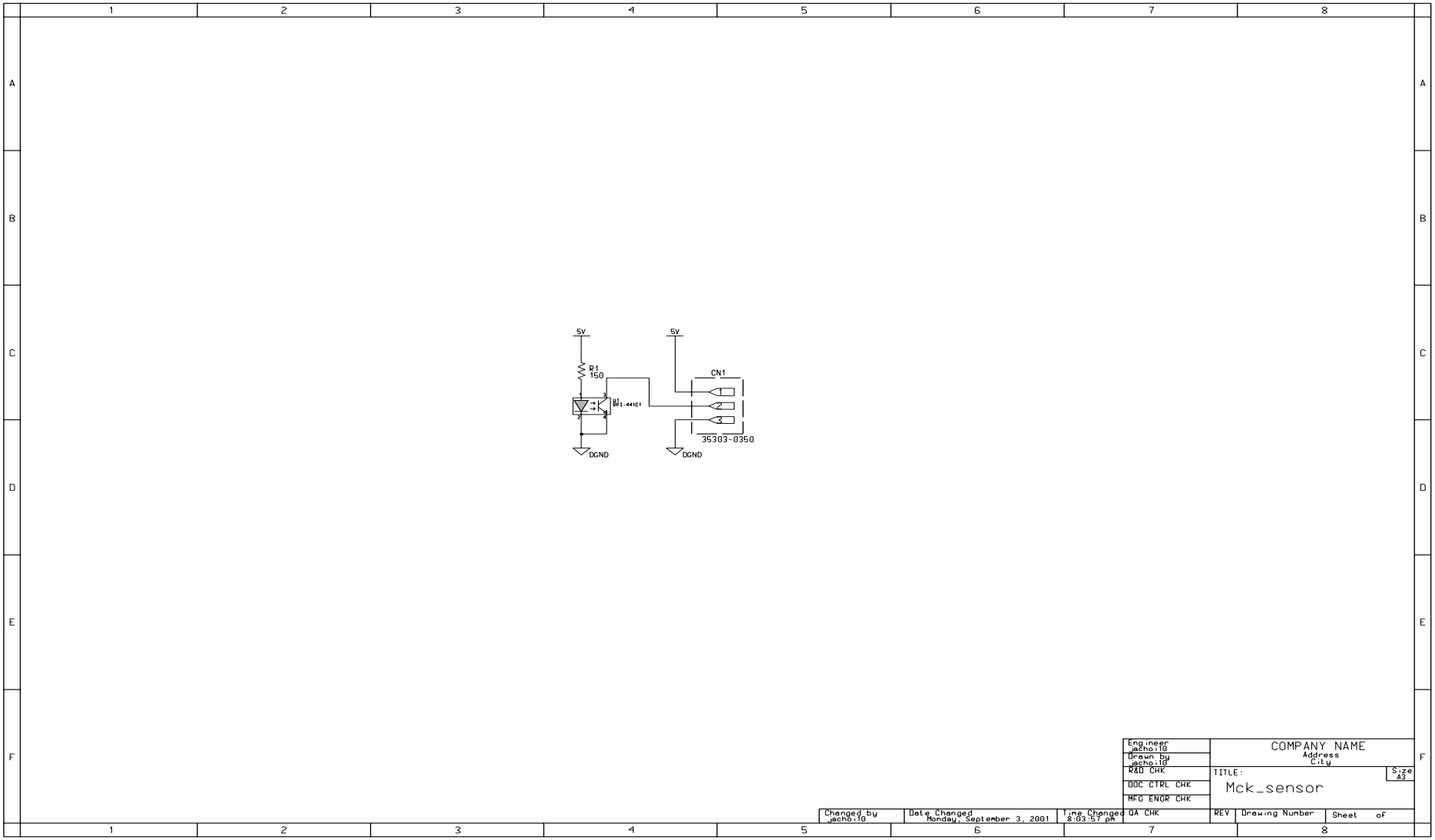
4-9 Sensor Circuit Diagram



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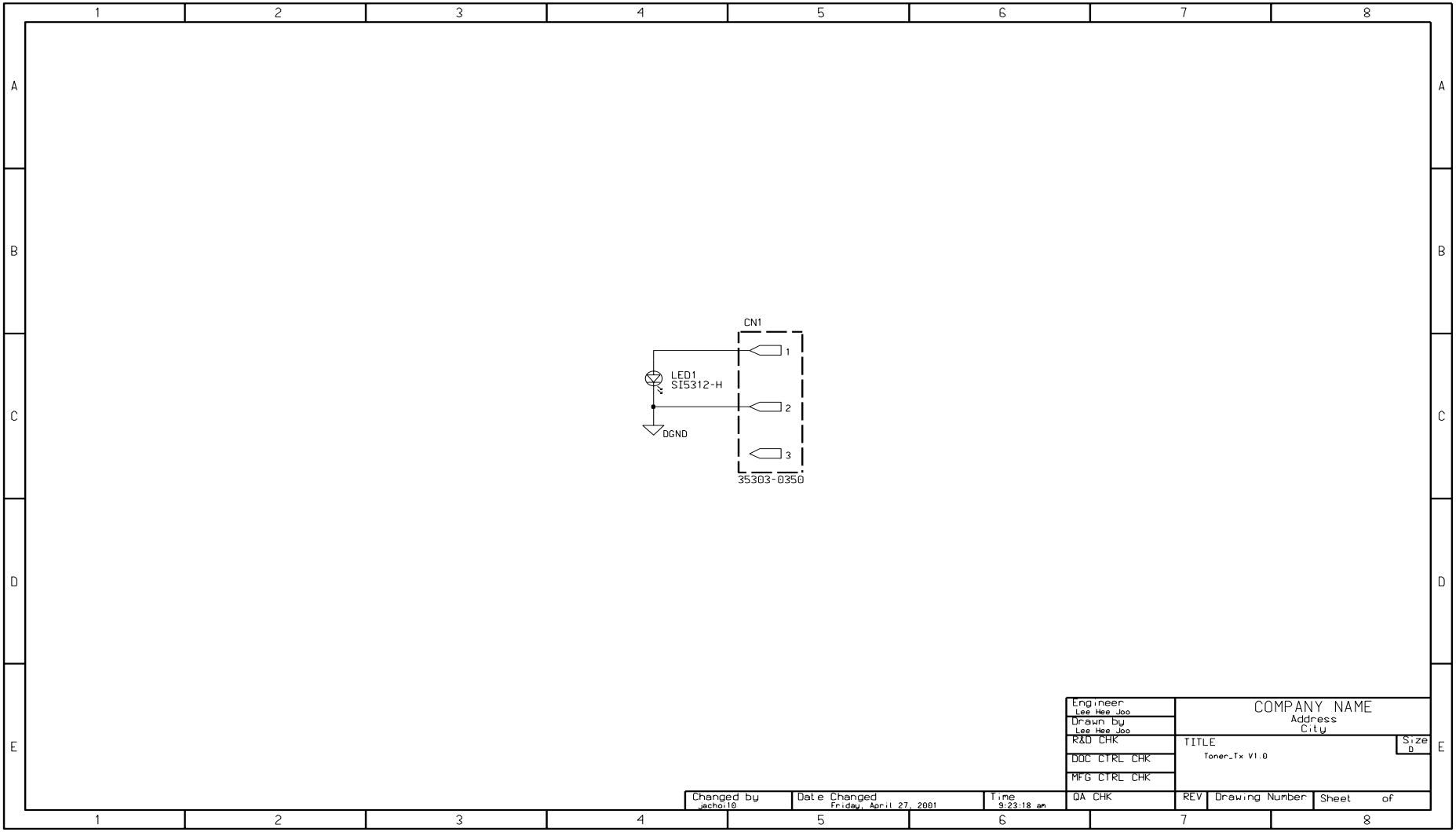
4-10 Toner_Rx Circuit Diagram



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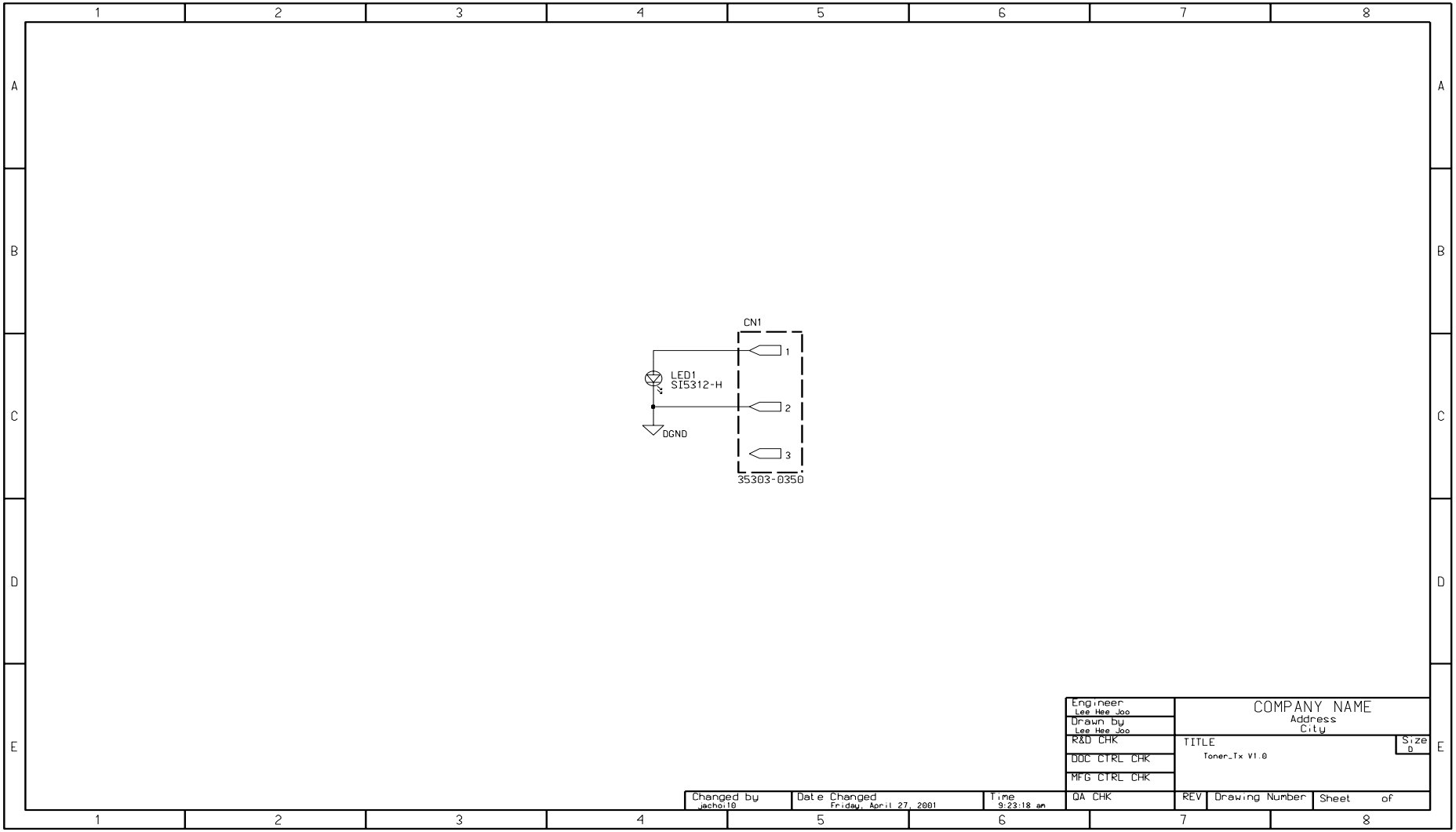
4-11 Toner_Tx Circuit Diagram



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